

The glory of God is intelligence,
or, in other words, light and truth.

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**1999–2000
GRADUATE
CATALOG**

**BRIGHAM
YOUNG
UNIVERSITY
BULLETIN
USPS No. 065-120**

Obtaining Catalogs

To order a copy of either the BYU Graduate Catalog or the BYU Undergraduate Catalog, please contact Mail Services, Brigham Young University, 296 UPB, Provo, UT 84602-1930, telephone (801) 378-3658. Within the United States, a BYU Graduate Catalog mailed second class costs \$8* and mailed first class costs \$10.50.* A BYU Undergraduate Catalog mailed second class costs \$10* and mailed first class costs \$12.50.* These prices include postage and handling. VISA, MasterCard, check, or money order is accepted in payment. On campus, both catalogs can be purchased at the BYU Bookstore: \$5 for the BYU Graduate Catalog and \$6 for the BYU Undergraduate Catalog. The graduate and undergraduate catalogs, as well as the class schedules, are also available on the Web at <http://ar.byu.edu/catalog> or through BYU's homepage at www.byu.edu.

*Subject to change.

About This Catalog

The university makes every effort to ensure the accuracy of the contents of this catalog but reserves the right to make changes at any time without prior notice. Since change is a part of university life, curriculum and program changes will likely occur during the time the 1999-2000 Graduate Catalog is in circulation. Students are advised to consult the following sources for current and specific information:

1. The appropriate university department or advisor.
2. The class schedule, printed three times a year, which includes up-to-date information on courses offered, class hours, class locations, and the latest calendar dates, fees, and registration details.

It is the student's responsibility to learn of and abide by current policies and requirements. In the event of change, every reasonable effort will be made to permit students affected to complete their programs or similar programs.

Policies and requirements in the General Information section of this catalog reflect standards of minimum performance and may be less stringent than those established by individual departments. Most departments have printed materials of their own describing in detail their programs, deadlines, expectations, and opportunities for financial assistance. Therefore, any potential applicants should notify prospective departments of their interest and request printed information from those departments. Because some application deadlines are as early as January for fall admission, and some departments admit new students only once a year, early inquiry is recommended.

The Law School and the Graduate School of Management require different application forms than that used for other graduate programs. Furthermore, the Law School publishes its own bulletin and follows a different calendar. Prospective applicants to these professional schools should write directly to them.

Statement of Nondiscrimination—Admission to Brigham Young University is nondiscriminatory. The university admits persons regardless of race, color, national origin, religion, age, gender, veteran status, or disability who meet university and department academic requirements and agree to abide by the university's standards of conduct and honor code.

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On the cover: Hubble Space Telescope image of a vast nebula called NGC 604.

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Where to Write or Call for Information

(Complete the following addresses with *Provo, UT 84602*-, inserting the last four digits of the PO box after the hyphen in the zip code.)

General Information on Graduate Education

Office of Graduate Studies
B-356 ASB, PO Box 21339
(801) 378-4091

Campus Tours

Visitors Center, PO Box 23200
(801) 378-4678

Graduate School of Management

730 TNRB, PO Box 23113
(801) 378-4123

International Services

1351 WSC, PO Box 27917
(801) 378-2695

Law School Admissions

340 JRCB, PO Box 28000
(801) 378-4277

Records

B-150 ASB, PO Box 21114
(801) 378-2631

Registration

B-130 ASB, PO Box 21114
(801) 378-2824

Scholarships and Awards

Individual academic departments

Student Employment Services

2024 WSC
(801) 378-3561

Student Housing

On-Campus Housing Office
100 SASB, PO Box 21820
(801) 378-2611
Off-Campus Housing Office
2170 WSC, PO Box 27909
(801) 378-5066

Student Loans

Financial Aid Office
A-41 ASB, PO Box 21009
(801) 378-4104

Tests (GRE, GMAT, LSAT, and Miller)

Testing Services
265 HGB, PO Box 22701
(801) 378-6129

Tuition and Fees

Cashiers' Office
D-155 ASB, PO Box 21128
(801) 378-7808

Veterans Support Office

B-150 ASB, PO Box 21113
(801) 378-2768

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BRIGHAM Young University offers an exceptional educational opportunity for the well-prepared graduate student who is seeking an environment where learning experiences with dedicated scholars characterize graduate study. Established and sponsored by The Church of Jesus Christ of Latter-day Saints, BYU is the largest privately owned university in the United States. The university president, Merrill J. Bateman, is directly responsible to the board of trustees, led by the president of The Church of Jesus Christ of Latter-day Saints and composed of Church authorities. In a time of constantly changing human values and increased challenges for higher education, BYU holds steadfastly to a singular vision that combines reasoned and revealed learning. Along with extensive undergraduate programs, BYU offers master's and doctoral degrees in a variety of disciplines through fifty-three graduate departments. In addition, the Law School and the Marriott School offer professional graduate degrees.

Founded in 1875 as Brigham Young Academy, the campus has grown from one building to 500 buildings on more than 600 acres. Its first class of twenty-nine students was taught by the academy's founding scholar, Karl G. Maeser. Now nearly 1,500 full-time faculty instruct 29,000 students. From its modest beginnings Brigham Young University has grown to become one of the nation's most distinguished institutions of private higher education. At BYU teaching and scholarly research are valued as essential complements of one another. Faculty and students work side by side in collegial scholarship enhanced by mutual commitment to the highest ideals of professional ethics and spiritual values.

Situated at the foot of the beautifully rugged Wasatch Range of the Rocky Mountains and bounded on the west by twenty-three-mile-long Utah Lake, the campus is the focal point of a city of 90,000 and a valley of 250,000. Beyond it to the south and east are spectacular areas of vast sandstone canyons and monoliths, several of which are national parks. Forty-five miles north is Salt Lake City.

The faculty at BYU have been schooled at some of the leading universities of the nation as well as of other countries, and many of them have achieved national and international prominence as teachers and scholars.

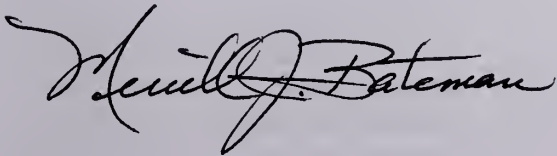


FROM THE PRESIDENT . . .

WITH this Brigham Young University Graduate Catalog let me welcome you to the university and to graduate studies. Graduate study offers a new set of experiences designed to enhance your capabilities and expand your opportunities to make a difference in the world. Graduate study sets the expectations and elevates the standards for a university: the parameters that sketch the depth of disciplinary knowledge, the breadth of scientific and creative discovery, and the rigor and virtue of individual and collective investment.

Through the process of graduate study a student becomes a contributor as well as a consumer of knowledge, someone who expands the world's store of knowledge; becomes competent in the application of knowledge, someone who improves the "moral, social, and ecological environment" for the benefit of others; becomes a creator of artistic expression, someone who refines the aesthetic and cultural fiber of society. At the graduate level faculty members and graduate students come together as partners in the fulfillment of these important endeavors. Also supportive to your graduate pursuits are the various libraries, laboratories, studios, museums, institutes, and centers, which are equipped to bolster the depth and breadth of your learning.

In the pages that follow you will learn about the university's degree requirements, policies, procedures, and course offerings, as well as its distinctive mission. These pages suggest not only the many intellectual and spiritual opportunities for you here, but also the context in which you will study. The university's commitment to excellent graduate study is demonstrated by its accomplished researchers, scholars, and teachers—individuals who will guide your efforts to observe more keenly, to contemplate more deeply, and to see more widely and insightfully than before. They will also assist you to express with clarity and offer with grace what you will henceforth be prepared to give. This is your challenge and your responsibility.

A handwritten signature in black ink, reading "Merrill J. Bateman". The signature is fluid and cursive, with the first name "Merrill" being more prominent and the last name "Bateman" following in a similar style.

Merrill J. Bateman

BRIGHAM YOUNG UNIVERSITY

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Assistant Advancement Vice President—Development

Student Life Vice President

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 John C. Lewis

George H. Bowie
 M. McClain Bybee
 Alton L. Wade
 Janet S. Scharman
 David A. Hunt

Brigham Young University is fully accredited by the Northwest Association of Schools and Colleges. In addition, many professional programs of the university are reviewed, evaluated, and accredited by national and state associations and boards.

For a complete listing of university officers, of organizations that have given full accreditation to related programs at the university, and of educational associations with which the university is affiliated, see the BYU Undergraduate Catalog.

MISSION OF BRIGHAM YOUNG UNIVERSITY

THE mission of Brigham Young University—founded, supported, and guided by The Church of Jesus Christ of Latter-day Saints—is to assist individuals in their quest for perfection and eternal life. That assistance should provide a period of intensive learning in a stimulating setting where a commitment to excellence is expected and the full realization of human potential is pursued.

All instruction, programs, and services at BYU, including a wide variety of extracurricular experiences, should make their own contribution toward the balanced development of the total person. Such a broadly prepared individual will not only be capable of meeting personal challenge and change but will also bring strength to others in the tasks of home and family life, social relationships, civic duty, and service to mankind.

To succeed in this mission the university must provide an environment enlightened by living prophets and sustained by those moral virtues which characterize the life and teachings of the Son of God. In that environment these four major educational goals should prevail:

- All students at BYU should be taught the truths of the gospel of Jesus Christ. Any education is inadequate which does not emphasize that His is the only name given under heaven whereby mankind can be saved. Certainly all relationships within the BYU community should reflect devout love of God and a loving, genuine concern for the welfare of our neighbor.
- Because the gospel encourages the pursuit of all truth, students at BYU should receive a broad university education. The arts, letters, and sciences provide the core of such an education, which will help students think clearly, communicate effectively, understand important ideas in their own cultural tradition as well as that of others, and establish clear standards of intellectual integrity.
- In addition to a strong general education, students should also receive instruction in the special fields of their choice. The university cannot provide programs in all possible areas of professional or vocational work, but in those it does provide the preparation must be excellent. Students who graduate from BYU should be capable of competing with the best in their fields.
- Scholarly research and creative endeavor among both faculty and students, including those in selected graduate programs of real consequence, are essential and will be encouraged.

In meeting these objectives BYU's faculty, staff, students, and administrators should also be anxious to make their service and scholarship available to The Church of Jesus Christ of Latter-day Saints in furthering its work worldwide. In an era of limited enrollments, BYU can continue to expand its influence both by encouraging programs that are central to the Church's purposes and by making its resources available to the Church when called upon to do so.

We believe the earnest pursuit of this institutional mission can have a strong effect on the course of higher education and will greatly enlarge Brigham Young University's influence in a world we wish to improve.

GRADUATE STUDY AT BRIGHAM YOUNG UNIVERSITY

Dean: Bonnie Brinton, Professor, Audiology and
Speech-Language Pathology
B-380 ASB
Provo, UT 84602-1341
(801) 378-4465

A UNIVERSITY is a place where men and women of character meet minds and ideas that have shaped and will continue to shape human experience in significant ways. It is a place where people read and think and create and analyze, and where they give expression to ideas. It is a place of intellectual and moral broadening and deepening. It is a place where people contribute new knowledge and arrive at new levels of understanding.

Graduate study distinguishes itself by advanced systematic study and experience in depth—a depth in understanding, knowledge, and scholarly competence and in inquiry and discovery. Successful graduates are equipped to contribute to their disciplines, to teach and transmit knowledge within their disciplines, to conduct research and be creative, to apply their learning in the everyday world, and ultimately to extend service to their disciplines and to humanity. Building on the foundation of a strong baccalaureate education, graduate studies at BYU adds an expectation of significantly greater levels of competency. Through graduate study, students achieve mastery of a discipline by engaging its primary sources and comprehending its literature and methodologies. The graduate degree connotes that

the graduate is not only aware of but has acquired experience in academic and professional roles and responsibilities.

Graduate study at the university culminates in doctoral and master's degrees in a broad range of academic disciplines and professional fields. The doctoral degree requires the student to demonstrate a high level of scholarly competence, which includes the ability to conduct and report significant research in a highly effective manner. Advanced systematic study in a discipline is also essential, and it is followed by comprehensive examinations that require students to integrate and understand the collective knowledge of their disciplines. A written dissertation resulting from independent research is scrutinized and tested in a concluding oral examination. The master's degree also includes advanced course work, demonstrated mastery on vital aspects of a discipline, skill in research methodology and theory, and preparation for future creative work. Nearly all master's programs involve integrating examinations and a major culminating piece of written work, usually a thesis, followed by an oral examination on that work.

Graduate study at Brigham Young University takes place within a learning environment characterized by rigorous programs of study, by selective admission of highly qualified students, and by a graduate faculty who are committed to excellence in teaching, scholarship and creative activity, and service.

GRADUATE COUNCIL

CONSISTING of senior faculty members from a variety of disciplines, the Graduate Council is one of a number of councils with major responsibility for academic programs and standards across the campus. The Graduate Council is primarily responsible for establishing and maintaining standards of quality in graduate education at Brigham Young University. In discharging this responsibility, the council sets policy, conducts extensive reviews of graduate programs, evaluates proposals for new programs, and makes recommendations to the academic vice president on a variety of issues affecting graduate education.

The goal of the council is to ensure that excellent graduate programs are offered and sustained at BYU. Thus, the university is engaged in a continuing effort to consolidate resources behind strong programs and excellent graduate experiences.

Current 1998–99 members of the Graduate Council are: James Hansen, Accountancy and Information Systems; Jeffrey Keith, Geology; Martha Peacock, Visual Arts; Jack Sites, Zoology; Brent Slife, Psychology; Craig Smith, Mechanical Engineering; Larry Tucker, Physical Education.

OFFICE OF GRADUATE STUDIES

ALTHOUGH departments and colleges carry the major responsibility for graduate programs at BYU, certain procedures occur centrally. The admissions process begins in the Office of Graduate Studies, B-356 ASB, Provo, UT 84602-1339, and progress toward a degree is recorded there. The office also maintains standards and requirements that apply uniformly across campus and serves as a clearinghouse for questions, problems, exceptions to

policy, and requests for policy changes. The office is staffed by advisors thoroughly familiar with policies and procedures at the general university level. It is in the student's home department, however, that the most important advising is done in regard to individual program requirements and procedures. It is essential that a student consult frequently with departmental advisors. In many instances department requirements exceed university minimums.

STANDARDS OF CONDUCT

THE Brigham Young University Honor Code as established by the university and the board of trustees for all students under its jurisdiction in institutions of higher learning appears in the Graduate Studies Application and the BYU Undergraduate Catalog. To know the substance and essence of that code is to know that Brigham Young University is unique among universities. Governed by principles basic to its sponsoring church, The Church of Jesus Christ of Latter-day Saints, it purposefully creates and nurtures an environment in which faith and intellect join together in the pursuit of truth.

All members of the Brigham Young University community—students, faculty, staff, and administrators—agree to live by the values of the gospel of Jesus Christ as found in the standard scriptural works of the Church and the teachings of Church leaders past and present. In essence, then, those who study and work here promise to live lives of kindness, honesty, chastity, virtue, and faithfulness. They promise to do good to their neighbors and to seek after whatever is “virtuous, lovely, or of good report or praiseworthy” (13th Article of Faith).

Such behavior is firmly rooted in eternal principles that have been cherished and articulated by the prophets and other wise men and women throughout the history of civilization. The great thinkers, writers, artists, statesmen, and scientists have taught the importance of life with honor. Beyond the profound thoughts of these men and women, however, are the sacred, inspired writings of God’s prophets. Although good principles can be found in the best of human creations, the ultimate power of these and all true principles is found in the gospel of Jesus Christ.

In practical terms, this means a high standard of conduct is expected of those who join the university community. As sons and daughters of God, all at BYU must strive to grow steadily in faith, intelligence, love, and integrity. All agree to follow the moral teachings of Jesus Christ and the living prophets, and to be honorable and compassionate in

their dealings with others. All agree to observe in letter and spirit the principles of health contained in the Word of Wisdom, specifically, to abstain from alcohol, tobacco, tea, and coffee, and from the abuse of drugs and other harmful substances. All agree to be honest in work and in human associations, never taking unfair advantage of others, never representing the work of others as their own, endeavoring to help others to reach their highest goals.

HONOR CODE

Students and faculty members at Brigham Young University have prepared the Honor Code, recognizing that it is a covenant between each person and all other members of the community, a covenant by which the community grants the privileges and opportunities of citizenship. Each person within the community accepts two fundamental responsibilities: (1) to maintain personal integrity by living the code and (2) to maintain the integrity of the community by helping others live the code.

The successful functioning of the Honor Code, indeed of the university itself, depends on mutual confidence and trust among students, faculty members, and staff. Unless each is assured that the other will uphold the compact, the code will fail and the university will be diminished. Moreover, students and faculty members share a joint responsibility for hearing and evaluating reports of Honor Code infractions.

The university’s very being is at stake in this matter. Its certification that a person has completed a class, a course of study, or the requirements for a degree is without value if the person obtained that certification through dishonesty. Similarly, a faculty member’s name and university affiliation on the report of a piece of research must signify that the work and the report are honest. Examination papers, laboratory work, essays, theses, projects, research tools, and all other kinds of work for classes and degrees are to be prepared with no use having been made of unauthorized or undocumented

materials of any kind. Students are not to give or receive aid in examinations or in class work where such is not permitted. Any individual violation of the Honor Code compromises every member of the community; therefore, the entire community has a deep-rooted investment in the honesty of every person at BYU.

In essence, then, a scholarly publication, grade, certification, or diploma from Brigham Young University should and must have special and particular significance with regard to honor.

DRESS AND GROOMING STANDARDS

The attire and grooming of both men and women should always be modest, neat, clean, and appropriate. See the Graduate Studies Application and the BYU Undergraduate Catalog for a detailed description of specific requirements. Registration at BYU constitutes an affirmative consent to abide by these standards and to represent the university and its sponsoring church in a manner that is becoming and dignified.

CONTINUING STUDENT ECCLESIASTICAL ENDORSEMENT

For each academic year in which students wish to register for any university credit, including thesis

hours, internships, or off-campus programs, they are required to have obtained a Continuing Student Ecclesiastical Endorsement. LDS students must be endorsed by the bishop of the ward in which they live and which holds their current Church membership records. Non-LDS students may be endorsed by the local leader of their preferred religious denomination or by the bishop of the LDS ward in which they live.

Requirements

All students must abide by the Honor Code, Residential Living Standards, and Dress and Grooming Standards. LDS students must fulfill their duty in The Church of Jesus Christ of Latter-day Saints, attend Church meetings, and abide by the rules and standards of the Church.

Withdrawn Continuing Student Ecclesiastical Endorsement

The Continuing Student Ecclesiastical Endorsement may be withdrawn at any time by a student's ecclesiastical leader. When an endorsement is withdrawn, the student will be required to discontinue enrollment at the university. The decision to withdraw an ecclesiastical endorsement may be appealed first to the student's stake president. In the case where a student is dissatisfied with the stake president's decision, an appeal may be made to the Honor Code Office.

UNIVERSITY LIBRARY

3080 HBLL
Provo, UT 84602-6878
(801) 378-2905

University Librarian: Sterling J. Albrecht
Deputy University Librarian: Randy J. Olsen
Assistant University Librarian: Julene Butler
Assistant University Librarian: Scott Duvall
Assistant University Librarian: Susan L. Fales
Assistant University Librarian: Larry J. Ostler

HOUSING over three million volumes, including an extensive collection of pamphlets, journals, current serials, newspapers, microform titles, and nonprint materials, the Harold B. Lee Library is a major resource for graduate student research. It is a depository for United States and Canadian government documents and regularly receives publications of state and local governments. Some of the library's strengths include special research collections in music in the areas of film, radio, viola, and harp. Notable collections have also been established in early modern European history, Renaissance Reformation history, American Church history, western Americana, Mormon Americana, nineteenth-century British literature, and the history of astronomy. Although many volumes of these collections are found in open stacks, special collection and manuscript items are located on Level 1 of the library's new addition.

BYU participates in several cooperative programs that allow students and faculty to use materials housed in other state institutions and major research libraries throughout the United States:

1. **Interlibrary loan services** (Mark Smith, 3424 HBLL, Provo, UT 84602-6881, telephone [801] 378-3624) allow students to borrow books from other institutions. Photocopies of journal articles may be obtained for photocopying costs. A RUSH telefacsimile service is also available.

2. Through the Utah Academic Libraries

Consortium arrangements have been made that allow students with valid BYU ID cards to borrow materials from other college and university libraries in the state.

3. The **Research Libraries Group** is a national consortium of major research libraries that work together to improve access to library resources necessary in scholarly research. The benefits of membership in this group include priority treatment of interlibrary loan requests from many major U.S. libraries (e.g., Yale, Princeton, Stanford, University of Michigan) and the availability of some materials that normally do not circulate. This group also sponsors a computerized shared-cataloging system that provides access to the computerized catalogs of member libraries. Inquiries are handled at the reference desk on the main floor (level 3, [801] 378-2927).
4. The **Center for Research Libraries** is an organization whose objective is to increase the availability of research materials to its more than 180 member institutions. Through this organization, many infrequently used materials are deposited in a common pool from which all members may borrow. BYU students may borrow from the center's collection of archives, dissertations, government documents, journals, monographs, and newspapers. Inquiries are handled at the Interlibrary Loan Office.
5. **BYU's Computer-Assisted Research Services**, through access to more than 200 computerized databases, provide bibliographic references on a given topic. There is a charge for computer connect time, but not for consultation services. Inquiries are handled in 3230 HBLL, Provo, UT 84602-6800, telephone (801) 378-5627.

The library also provides a number of special services for graduate students. Graduate students may check out circulating books for thirteen weeks rather than three (the undergraduate limit). Research personnel in the library, in addition to reference desk

staff, will work individually and in depth with graduate students on their research projects and theses.

The facilities of other libraries operated by The Church of Jesus Christ of Latter-day Saints are also available to Brigham Young University students. The Family History Library in Salt Lake City contains approximately 100,000 books and more than

800,000 rolls of microfilm. A regional family history library, operating under the general direction of the Church Family History Department, is located in the Harold B. Lee Library. The library of the Church Historical Department is also available by arrangement to advanced students for research. This facility is in the LDS Church Office Building in Salt Lake City.

UNIVERSITY GRADUATE STUDIES CALENDAR

Fall Semester 1999

Many departments have deadlines earlier than the general university deadlines listed below. Contact departments for specific deadlines.

- | | |
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| <p>January 10, 1999 Departmental application deadlines for fall 1999 entry to graduate study may be as early as January 10, 1999. For specific program and department deadlines and requirements, refer to the department listing in this catalog or check with the department.</p> <p>June 1 Financial aid priority processing date for Federal Stafford Loans</p> <p>August 23–25 Annual University Conference</p> <p>29 Last day to officially discontinue enrollment without a tuition charge for fall semester 1999</p> <p>30 Classes begin</p> <p>30 Late registration begins for all students who did not use the advance registration system</p> <p>September 1 Last day to apply for BYU short-term loans from Financial Aid Office to pay fall semester 1999 tuition by payment deadline</p> <p>September 6 Labor Day holiday</p> <p>13 Last day to late register or add classes. Classes dropped after this date will appear with W (official withdrawal) on the transcript.</p> <p>13 Last day to pay tuition</p> <p>24 Last day graduate students may apply for December 1999 graduation (graduation fee must be paid)</p> <p>October 4 Last day to drop a class for academic reasons and/or officially discontinue from the university without being graded</p> | <p>November 5 Last day students in dissertation, thesis, or selected project programs may schedule a final oral examination (defense of their work) and submit a copy of their work to their department for December 1999 graduation</p> <p>15 Full payment due on BYU short-term loans for fall semester 1999</p> <p>19 Last day students in dissertation, thesis, or selected project programs may have a final oral examination (defense of their work) for December 1999 graduation</p> <p>23 Last day to officially withdraw from the university or drop classes for nonacademic emergencies</p> <p>24–26 Thanksgiving Day holiday</p> <p>December 1 Last day to apply for BYU short-term loans from Financial Aid Office to pay winter semester 2000 tuition by payment deadline</p> <p>3 Last day students may submit their dissertation, thesis, or selected project to the dean of their college for approval for December 1999 graduation</p> <p>9 Last day of class instruction</p> <p>10 Last day students may submit final copies of their dissertation, thesis, or selected project to the library copy center for binding; complete remaining requirements for a degree; pay fees; and submit examination results (oral or written) and grade changes for I's, T's, etc., to the Office of Graduate Studies for December 1999 graduation</p> <p>10–11 Reading days</p> <p>13–17 Final examinations</p> <p>17 December graduation (no commencement exercises)</p> |
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Winter Semester 2000

Many departments have deadlines earlier than the general university deadlines listed below. Contact departments for specific deadlines.

- January 10, 1999 Departmental application deadlines for winter 2000 entry to graduate study may be as early as January 10, 1999. For specific program and department deadlines and requirements, refer to the department listing in this catalog or check with the department.
- January 3, 2000 Last day to officially discontinue enrollment without a tuition charge for winter semester 2000
- 3 Last day to apply for BYU short-term loans from Financial Aid Office to pay winter semester 2000 tuition by payment deadline
- 4 Classes begin
- 4 Late registration begins for all students who did not use the advance registration system
- 15 Last day to pay tuition
- 17 Martin Luther King Day holiday
- 18 Last day to late register or add classes. Classes dropped after this date will appear with W (official withdrawal) on the transcript.
- 21 Last day graduate students may apply for April 2000 graduation (graduation fee must be paid)
- February 8 Last day to drop a class for academic reasons and/or officially discontinue from the university without being graded
- 21 Presidents' Day holiday
- 22 Monday class instruction. No Tuesday classes
- 25 Last day students in dissertation, thesis, or selected project programs may schedule a final oral examination (defense of their work) and submit a copy of their work to their department for April 2000 graduation

- March 10 Last day students in dissertation, thesis, or selected project programs may have a final oral examination (defense of their work) for April 2000 graduation
- 15 Full payment due on BYU short-term loans for winter semester 2000
- 17 Last day students may submit their dissertation, thesis, or selected project to the dean of their college for approval for April 2000 graduation
- 24 Last day students may submit final copies of their dissertation, thesis, or selected project to the library copy center for binding; complete remaining requirements for a degree; pay fees; and submit examination results (oral or written) and grade changes for I's, T's, etc., to the Office of Graduate Studies for April 2000 graduation
- 30 Last day to officially withdraw from the university or drop classes for nonacademic emergencies
- April 12 Last day of class instruction
- 13–14 Reading days
- 15, 17–20 Final examinations
- 20 Graduation—university commencement
- 21 Graduation—college convocations

Spring Term 2000

Many departments have deadlines earlier than the general university deadlines listed below. Contact departments for specific deadlines.

- September 15, 1999 Departmental application deadlines for spring 2000 entry to graduate study may be as early as September 15, 1999. For specific program and department deadlines and requirements, refer to the department listing in this catalog or check with the department.
- April 21 Last day to apply for BYU short-term loans from Financial Aid Office to pay spring term 2000 tuition by payment deadline
- 25 Last day to officially discontinue enrollment without a tuition charge for spring term 2000

- 26 Classes begin
- 26 Late registration begins for all students who did not use the advance registration system
- May 3 Last day to late register or add classes. Classes dropped after this date will appear with W (official withdrawal) on the transcript.
- 3 Last day to pay tuition
- 12 Last day to drop a class for academic reasons and/or officially discontinue from the university without being graded
- 19 Last day graduate students may apply for August 2000 graduation (graduation fee must be paid)
- 29 Memorial Day holiday
- June 1 Last day to officially withdraw from the university or drop classes for nonacademic emergencies
- 13 Last day of class instruction
- 14 Reading day
- 15-16 Final examinations
- 16 Last day students in dissertation, thesis, or selected project programs may schedule a final oral examination (defense of their work) and submit a copy of their work to their department for August 2000 graduation

Summer Term 2000

Many departments have deadlines earlier than the general university deadlines listed below. Contact departments for specific deadlines.

- September 15, Departmental application deadlines
 - 1999 for summer 2000 entry to graduate study may be as early as September 15, 1999. For specific program and department deadlines and requirements, refer to the department listing in this catalog or check with the department.
- June 16 Last day to apply for BYU short-term loans from Financial Aid Office to pay summer term 2000 tuition by payment deadline

- 16 Last day students in dissertation, thesis, or selected project programs may schedule a final oral examination (defense of their work) and submit a copy of their work to their department for August 2000 graduation
- 18 Last day to officially discontinue enrollment without a tuition charge for summer term 2000
- 19 Last day graduate students may apply for August 2000 graduation (graduation fee must be paid)
- 19 Classes begin
- 19 Late registration begins for all students who did not use the advance registration system
- 26 Last day to late register or add classes. Classes dropped after this date will appear with W (official withdrawal) on the transcript.
- 26 Last day to pay tuition
- 30 Last day students in dissertation, thesis, or selected project programs may have a final oral examination (defense of their work) for August 2000 graduation
- July 4 Independence Day university holiday
 - 6 Last day to drop a class for academic reasons and/or officially discontinue from the university without being graded
 - 7 Last day students may submit their dissertation, thesis, or selected project to the dean of their college for approval for August 2000 graduation
- 14 Last day students may submit final copies of their dissertation, thesis, or selected project to the library copy center for binding; complete remaining requirements for a degree; pay fees; and submit examination results (oral or written) and grade changes for I's, T's, etc., to the Office of Graduate Studies for August 2000 graduation
- 24 Pioneer Day holiday

- 26 Last day to officially withdraw from the university or drop classes for nonacademic emergencies
- August 7 Last day of class instruction
- 8 Reading day
- 9–10 Final examinations
- 10 Graduation—university commencement
- 11 Graduation—college convocations

GENERAL INFORMATION

TUITION AND FEES

Cashiers' Office
D-155 ASB
Provo, UT 84602-1128
(801) 378-7808

All students who register at BYU must pay their full tuition and fees (in U.S. dollars) by the add deadline of the semester or term of attendance. Fees are to be paid at the Cashiers' Office. Questions regarding fee assessment should be addressed to Financial Services (D-148 ASB). The university reserves the right to change tuition and fees without notice.

Because students beyond the baccalaureate degree typically make a heavier demand on university resources than undergraduate students do, they are assessed at a higher tuition rate.

Full-Time and Part-Time Tuition Assessment

Students assessed full-time tuition pay a fixed rate of tuition; students assessed part-time tuition pay for the number of credit hours taken.

Full-time: 8.5 or more hours in a semester
4.5 or more hours in a term

Part-time: Fewer than 8.5 hours in a semester
Fewer than 4.5 hours in a term

Note: A fraction of an hour is counted as a full hour for assessing fees.

Audited Courses

The charge for auditing a course (attending class but not receiving a grade or credit) is the same as for taking the course for credit. Audited courses do not appear on the transcript.

Tuition

A significant portion of the cost of operating the university is paid from the tithes of The Church of Jesus Christ of Latter-day Saints. Therefore, students and families of students who are tithe-paying members of the Church have already made a contribution to the operation of the university. Because others have not so contributed, they are charged a

higher rate of tuition. This practice is similar in principle to that of state universities that generally charge nonresidents at a higher rate than residents.

Refunds

Students who officially discontinue from the university may receive a partial refund of tuition and fees. Details concerning discontinuance procedures and refund schedules are printed in the current class schedule.

1999–2000 Tuition Schedule

Per Semester (fall or winter)		Per Term (spring or summer)	
LDS	Non-LDS	LDS	Non-LDS

Graduate Students (other than students in the Law School and Graduate School of Management)

Full-Time			
\$1,665	\$2,500	\$830	\$1,250
Part-Time			
\$185	\$278	\$185	\$278
per hour	per hour	per hour	per hour

Graduate School of Management and Law School Students

Full-Time			
\$2,665	\$4,000	\$1,330	\$2,000
Part-Time			
\$296	\$444	\$296	\$444
per hour	per hour	per hour	per hour

Fees

Late Tuition Payment Fee

Full-time and part-time students who pay tuition after the tuition payment deadline (see current class schedule) for a semester or a term are assessed the following late fees:

Semesters:

After the add deadline \$90

Terms:

After the add deadline. \$45

Students whose tuition check is not honored by the bank will be charged the late fee in effect at the time the check is redeemed.

Class Fees

Some courses require a fee in addition to tuition, to be paid upon registration. See course listings.

Miscellaneous General Fees

The university assesses fees for a variety of services. The following apply specifically to graduate education:

Application fee (nonrefundable) \$30

Graduation fee (nonrefundable)

Master's degree \$20

Doctoral degree \$25

Graduate minimum registration fee \$370

(for graduate students using university facilities without formal registration for university classes)

Microfilming of dissertation

(doctoral students only) *\$55

Special examination fee

Nonrefundable fee for each course challenged. \$20

Thesis binding (four copies) *\$52

*Subject to change without notification.

ADMISSIONS

Office of Graduate Studies

B-356 ASB

Provo, UT 84602-1339

(801) 378-4091

Applications for admission to graduate study are available from the Office of Graduate Studies. The Law School (340 JRCB, Provo, UT 84602-8000, telephone [801] 378-4277) and the Marriott School (730 TNRB, Provo, UT 84602-3113, telephone [801] 378-4123) use different forms, which they furnish upon request.

Deadlines for Application to Graduate Studies

Application deadlines vary by department and program and are listed in the catalog under the department sections. All parts of the application (including test scores, letters of recommendation, transcripts, and any additional materials required by the department) must be received by the Office of Graduate Studies on or before the published deadline. Many programs recommend submitting complete applications at least 30 days before their published application deadlines.

Application Requirements

Admission to graduate study is highly selective and is granted to a specific program for a specific semester or term. As a minimum, applicants who wish to be considered for admission must do the following:

1. Submit a complete application before the application deadline. An application is not considered complete until the application fee has been paid and all official transcripts, letters of recommendation (Form C), the statement of intent, and the confidential report (Form B) are in, as well as Forms A and D of the admissions application.
2. Agree to maintain university standards of personal conduct.
3. Receive a baccalaureate degree from an accredited U.S. or Canadian university before the expected semester of entry. The Office of Graduate Studies must receive an official transcript showing that the degree has been conferred. Without such verification, registration will not be permitted beyond the first semester.
4. Have earned at least a 3.0 GPA (on a 4.0 scale) in the last 60 semester hours of course work.

5. Satisfy departmental requirements for consideration, including national examinations (such as the GRE) specified by the department.

Note: *Students applying concurrently to more than one program must complete a separate application for each program and pay a separate fee for each application, but they need submit only one Honor Code Commitment and Confidential Report (Form B).*

International Applicants (all non-U.S.)

In addition to the requirements described above, international applicants must do the following:

1. Submit a TOEFL score of at least 213 (paper-based test 550) with no subscore lower than 18 (paper-based test 50). Some departments require a higher minimum score. The TOEFL examination is required of all applicants for whom English is not the native language. Students with a bachelor's degree from a U.S. or Canadian university are exempt from this requirement.
2. Submit a completed Financial Certification form (I-1), with supporting documents. Applicants must provide proof of sufficient funds for the total length of their program of study.
3. Submit an official transcript from each institution attended, with accompanying official English translation.
4. Submit an official copy of a degree certificate showing completion of a program at least equivalent to a U.S. bachelor's degree, with accompanying official English translation.

Note: Brigham Young University will not process applications from applicants entering the United States with a "B" or tourist visa.

Full Disclosure Requirement

All information and documents required for admission must be submitted, including transcripts from every institution attended. Incomplete information or falsification of information constitutes grounds for immediate dismissal and loss of all credit earned at BYU. Once the university receives application materials, those materials become the property of the university and are kept in the strictest confidence as required by university policy. Once the parts of an application have been received, materials will not be returned to the applicant.

Admissions Process

The Office of Graduate Studies receives and checks all parts of the application for completeness. Information for the department (Form D), the statement of intent, one copy of the official transcripts, letters of recommendation, and other departmental requirements are forwarded to the department; other parts of the application are retained in the Office of Graduate Studies. When the application is complete (an application from an international applicant must also include the TOEFL score and financial clearance to be complete), the Office of Graduate Studies clears the applicant for the department's consideration and asks for the department's recommendation.

Notice of Acceptance or Denial

After the admissions file has been reviewed for final acceptance by the department and the Office of Graduate Studies, the university notifies applicants of the admissions decision. Only a letter from the Office of Graduate Studies grants official university acceptance. International applicants receive an I-20 form or IAP-66 (Certificate of Eligibility) with their official acceptance letter; the I-20 and IAP-66 are used to obtain a student visa (F-1 or J-1).

Newly admitted international students are required to attend an orientation meeting at the beginning of their first semester. Details are available at International Services (350 SWKT, Provo, UT 84602-5520, telephone [801] 378-2695).

Non-Degree-Seeking Applicants

Students with a baccalaureate degree who are interested in registering at BYU on a non-degree-seeking basis may register for courses on a space-available basis. During fall and winter semesters, enrollment is limited to part-time (eight hours or less). To be considered for admission as a non-degree-seeking student, applicants should have a 3.0 (B) grade point average and complete an undergraduate application with a statement attached explaining their purpose in seeking enrollment and describing the courses they intend to take.

Students with a baccalaureate degree who are seeking teacher certification should refer to the undergraduate catalog or the Admissions Office for information.

Questions about non-degree-seeking applications should be directed to an admissions counselor in the BYU Admissions Office (A-183 ASB, Provo, UT 84602-1110, telephone [801] 378-2500).

REGISTRATION

B-130 ASB
Provo, UT 84602-1114
(801) 378-2824

Eligibility

Upon receipt of an official letter of acceptance from the Office of Graduate Studies, new graduate students are eligible to register. Continuing graduate students are eligible if they have fulfilled the minimum registration requirement (6 hours per year) in the preceding academic year.

Registration Materials

The current class schedule bulletin contains complete registration instructions, deadlines, and a list of all classes offered, including times, instructors, and locations. It is mailed to all new students with U.S. or Canadian mailing addresses. Continuing students may purchase one at the BYU Bookstore or the Registration Office. International students may obtain class schedule bulletins and register when they arrive on campus.

Registration Process

The current class schedule contains a complete description of the registration process. What follows is a brief summary of that process:

Brigham Young University allows students to register by Touch-tone telephone or by using Academic Information Management (AIM) computer terminals (located in advisement centers and various campus locations). For fall and winter semesters, the process begins when the Registration Office mails a Registration Notice to all eligible students. This form indicates the time the student can begin to register, allows for a change of address, and shows any prior balance due that must be paid before registration is possible. Beginning registration times are assigned on a priority basis with graduate students given the first priority. Registration for fall begins in April, for winter semester in October, and for spring and summer terms in February. With the Touch-tone system

and AIM terminals, students can register and make registration changes until classes begin.

A Tuition Billing Statement with a listing of classes is mailed approximately six weeks prior to the tuition deadline to each student registered for at least one class. Students who fail to pay tuition by the add deadline of a semester or term will be assessed late-tuition fees.

Once a student registers for classes, that student is officially enrolled and committed to attend. A student who then decides not to come must drop all classes. Prior to the first day of school, classes may be dropped using the discontinuance action code on the Touch-tone telephone registration system. Once school begins, students should contact the Discontinuance Office in B-150 ASB, Provo, UT 84602-1114, or telephone (801) 378-7705. Classes that are not dropped will remain on the student's record and be charged tuition. Tuition will be charged starting the first day of class to the date of discontinuance at the percentage rate listed in the current class schedule.

Changes in Registration

Students may add or drop classes twenty-four hours a day by Touch-tone telephone or AIM terminal until classes begin. After the semester or term has started, however, each academic department determines how classes are added in that department. Final dates, fees, and instructions for adding and dropping classes are printed in the current class schedule.

Auditing Classes

U.S. students who wish to audit classes (attend but not receive credit) may add such classes on a space-available basis with instructor approval during the first ten class days of a semester (six days of a term). Students are charged the same tuition for auditing classes as for taking classes for credit. International students may not audit classes. Audited classes do not appear on the transcript, will not be considered in calculating enrollment verifications, will not fulfill the minimum registration requirement, and do not apply toward a graduate degree. In addition, audited courses may not be paid for by graduate scholarship funds.

Enrolling in Religion Courses

Graduate students are eligible to enroll in religion courses on a space-available basis without incurring

any additional tuition costs. Details about such registrations are available from the Office of Graduate Studies, B-356 ASB, telephone (801) 378-4091.

Registration Requirements

First Semester

Because acceptance is granted for a specific semester, students are required to register for at least 2 hours in the semester for which acceptance has been granted, or the acceptance is forfeit. New students who do not enroll in the semester or term for which they are accepted and who wish to enroll in a subsequent semester must inform the Office of Graduate Studies immediately. Acceptance in one semester or term does not guarantee acceptance in a subsequent semester or term.

Minimum Registration Requirement

U.S. Students, Semester or Term. U.S. graduate students are required to register for at least 2 credit hours during any semester or term in which they use any university facilities, consult with faculty, or take comprehensive or oral examinations. The number of graduate credit hours for which they register must, in the judgment of the faculty advisor, accurately reflect the student's involvement in graduate study and use of university resources such as libraries, laboratories, and computer facilities. In no case will the registration be for fewer than 2 credit hours per semester.

U.S. Students, Academic Year. To retain active status and to qualify for subsequent registration, graduate students *must register for at least 6 semester hours each school year* and receive acceptable grades (no D, E, UW, NS, or I grades are allowed, nor are audits or correspondence courses). Students who do not fulfill this yearly requirement are dropped from their graduate programs; they lose their graduate status and must apply for readmission if they wish to continue.

International Students. International students must register for at least 9 semester hours each fall and each winter semester to fulfill U.S. Immigration and Naturalization Service requirements. Questions should be directed to International Services (350 SWKT, Provo, UT 84602-5520, telephone [801] 378-2695).

Readmission

Former graduate students who were dropped for failure to meet the minimum registration requirement, and who wish to resume their graduate studies, must submit an Application to Resume Graduate Study (available from the Office of Graduate Studies), pay a \$30 nonrefundable processing fee, and submit a Reapplication Honor Code Commitment Form. International students will also need to submit a new Financial Certification Form. Students should expect their previous course work to be reevaluated and their degree requirements to reflect current expectations of the program.

Loss of Eligibility to Register

Once enrolled, a graduate student becomes ineligible to register for subsequent semesters if:

1. The student has not fulfilled the minimum registration requirement (6 hours per year), has withdrawn from the graduate program, or has had his or her graduate degree program terminated by the department.
2. The student has not submitted a program of study by the third week of the second semester after admission.
3. The Office of Graduate Studies has not received official transcripts showing that the required prerequisite degrees have been conferred.
4. The student has violated the BYU Honor Code and is not cleared by the Honor Code Office.
5. The student has failed to submit an annual continuing ecclesiastical endorsement.
6. The student has graduated from the graduate program.

Financial Aid Registration Requirements

It is the student's responsibility to comply with any registration requirements established by sponsoring agents for student loans, loan payment deferrals, assistantships, internships, scholarships, and awards.

Graduate Assistants, Interns, and Award

Recipients. Graduate students receiving assistantships, awards, or internships through BYU must register for at least 2 hours per semester or for 1 hour per term. Departmental requirements may exceed these minimums, and international students must register for at least 9 semester hours each fall and winter semester.

BYU Short-Term Loans. Only degree-seeking students enrolled in day school are eligible for short-term BYU tuition loans. Since the amount borrowed is directly applied toward the cost of tuition, no minimum level of enrollment is required.

Federal Loans (Stafford Loans and Supplemental Student Loans). To qualify for federal loans, graduate students must normally register for at least 4.5 hours each semester or 2.5 hours each term.

However, the regulations require that students who have used their six-month "grace" period but wish to defer payment on a previous federal loan must be registered full-time—8.5 or more hours per semester and 4.5 or more hours per term. Independent study, audit, or workshop classes cannot be used to meet the minimum hour requirement.

Verification of Enrollment Status

A student who is enrolled for 8.5 or more credit hours a semester or 4.5 credit hours or more for a term is considered full-time for tuition purposes. International students and students receiving financial assistance may be required to register for more hours to be considered a full-time student. A student enrolled for 4.5 to 8 credit hours a semester or 2.5 to 4 credit hours a term is considered a half-time student. Graduate students may request verification of their enrollment status from the Records Office, B-150, ASB, Provo, UT 84602-1114, telephone (801) 378-2631.

Master's and doctoral students who are enrolled for fewer than 8.5 credit hours per semester can petition for full-time status. To be considered for an exception a student must:

1. Have completed all required course work and have only the thesis or dissertation to complete, or be limited to less than full-time enrollment because of a required teaching assistantship, research assistantship, or internship. (The combination of TA/RA assignment and registration must be equivalent to a full-time load, e.g. half-time assistantship plus 6 credit hours of registration per semester.)
2. Be enrolled for at least 2 credit hours per semester or 1 credit hour per term.
3. Be certified by his or her department as being engaged full-time (40 hours or more per week) in pursuit of a degree.

Requests for such an exception should be directed to the Office of Graduate Studies.

Withdrawal or Discontinuance

Students who wish to withdraw from the university must initiate that process at the Discontinuance Office, B-150 ASB, Provo, UT 84602-1114, telephone (801) 378-7705.

ADVISEMENT

Academic Sponsor

Once accepted into a graduate program, students are assigned a department sponsor, often the department graduate coordinator, who guides their first registration and individual study until the student's graduate committee is appointed in the *first semester*.

Graduate Committees

Master's (thesis and nonthesis) committees will consist of, at the minimum, three members; doctoral committees, five members. The members of both master's and doctoral committees must be graduate faculty. In those cases when a student declares a minor, one member of the committee must be from the minor department. Departments may have additional members; nevertheless, they are intended to be *permanent* members of the student's committee.

All committee members share in the responsibility for advising and directing the student concerning course work, degree requirements, and research (thesis and dissertation) and creative work. For example, all will participate in such events as prospectus meetings, comprehensive exams, and thesis/dissertation defenses and will be responsible for the evaluation of the student's performance. The individual contribution of committee members may vary by kind, effort, and intensity. Committee formation should occur *no later* than at the time of submission of the student's program of study.

Program of Study

The program of study is a carefully considered outline that helps students fulfill all degree requirements. Master's students should complete the program of study under the direction of their graduate committee during the student's first semester, and in no case later than the third week of the second semester. Doctoral students should receive approval and submit their program of study during the first

DEGREE REQUIREMENTS

year, and in no case later than the third week of the beginning of the second year of study. Students without a program of study recorded with the Office of Graduate Studies will not be able to register for subsequent semesters. Necessary changes in a student's program or committee can be made if authorized by the student's committee and department graduate coordinator.

Progress Reports

Three times a year (during the first month of fall and winter semesters and spring term) each graduate student is sent a computer-generated progress report that compares the individual program of study with the courses taken and summarizes the student's progress in a program: classes completed, current registration, classes still needed, and grade point average. In addition, the progress report alerts a student to possible problems with academic status, GPA, current registration, prerequisite degrees needed, minimum registration requirements, time limits, and courses.

DEGREE REQUIREMENTS

The following minimum standards for graduate programs have been established by the university, though it is not uncommon for departments to have higher standards. Additional information about specific requirements for each graduate program appears under individual department listings in this catalog. Furthermore, most departments publish detailed information about their program requirements that is available from department offices on request. Students should consult frequently with department graduate coordinators and committee chairs.

Doctor of Philosophy Degree

Admission Requirements

An applicant seeking admission to a program leading to the doctor of philosophy degree must meet the requirements outlined in the Admissions and departmental sections of this catalog. Prospective students should consult with individual departments for specific requirements.

Course Work Requirements

Graduate committees or program advisors, appointed following admission to a graduate program, will help students prepare their programs of study. The following credit requirements must be met:

1. *Credit Hours.* The minimum required for students with no master's degree is 54 semester hours beyond the baccalaureate degree; but the 54 hours may not include undergraduate (100 to 400 level) or other courses needed to fulfill prerequisite and skill requirements, or more than 18 hours of dissertation credit. Students who have earned a master's degree must complete at least 36 semester hours of additional graduate work at BYU beyond the master's degree. So long as these restrictions are met, students may, with the approval of their graduate committee, apply up to 36 hours of a master's program toward a doctoral degree. See the Credit Policies section of this catalog for information about credits that may not apply toward a graduate degree.
2. *Minor.* If a minor is required as part of a doctoral degree, a student must:
 - a. Obtain the approval of the department chair of the major and the minor departments.
 - b. Select a graduate faculty member from the minor department (approved by the department chair of the minor department) to serve as a graduate committee member.
 - c. Register for and complete 12 semester hours of approved graduate credit in the minor.
 - d. Pass an oral or a written comprehensive examination in the minor field (prepared by the minor committee member).
3. *Dissertation Credit.* A student seeking a doctor of philosophy degree must register for and complete a minimum of 18 hours of dissertation credit. No more than 18 hours may count toward the 54 hours required, and all 18 hours may not be taken in one term or semester. Registration for dissertation credit and work on the dissertation must be concurrent.

Time Limit

A doctoral degree must be completed within eight years of the first semester of enrollment. See the Credit Policies section of this catalog for more detailed information about outdated credits and the time limit.

Residency

Doctoral students must register for at least two consecutive 6-hour semesters on the BYU campus.

Comprehensive Examination

Doctoral students must pass a written comprehensive examination in their field under the direction of the major department. This examination is normally given when the student has completed the required course work for the doctoral degree. Some departments also require an oral portion of the comprehensive examination. In the case of a declared minor, it is expected that the examination will include subject matter from the minor field. A student is advanced to degree candidacy only after successful completion of the comprehensive examination.

Oral Defense of Dissertations

The final oral examination (defense of the dissertation) must be scheduled with the Office of Graduate Studies *at least two* weeks in advance. Final examinations may not be held during the interim periods between semesters. All members of the BYU academic community are invited to attend the final oral examination, but only members of the student's graduate committee may question the candidate and vote on the candidate's performance.

An unbound copy of the candidate's dissertation must be placed in the student's graduate department at least two weeks in advance of the oral examination so that interested faculty and students may review it before the examination.

Examination Results

The committee may vote to "pass," "pass with qualification," "recess," or "fail" the student.

If the decision is to pass with qualification, the committee may require minor revisions of the dissertation, strengthening of the candidate's preparation in subject matter areas, or both. When these qualifications are cleared and the committee chair has properly recorded the clearance with the Office of Graduate Studies, the student is judged to have passed the examination.

If *two or more* examiners vote to recess, the examination is recessed. This permits the candidate to reschedule (with the department and the Office of Graduate Studies) a second and final examination.

The new examination cannot be held sooner than a month after the recessed examination.

If *two or more* examiners vote to fail, the examination is failed and the graduate degree program of the student is terminated.

Doctor of Education Degree

Requirements for the doctor of education degree are in many ways the same as for the doctor of philosophy degree described in the preceding section. Differences in the two programs are as follows:

Differences in Admission Requirements

In addition to the requirements included in the Admissions section of this catalog, an applicant seeking admission to a doctor of education program must either be certified as a teacher or have completed 22 semester hours of approved courses. Further, an applicant must have completed two years of successful professional experience. Prospective students should consult with individual departments for specific requirements.

Differences in Course Work Requirements

1. *Credit Hours.* EdD degrees require more hours than the minimums described for PhD programs.
2. *Dissertation Credit.* A student seeking a doctor of education degree must register for and complete a minimum of 12 hours of dissertation credit. No more than 12 hours may count toward the minimum hours required, and the 12 hours may not all be taken in one term or semester. Registration for dissertation credit and work on the dissertation must be concurrent.

Master's Degree

Admission Requirements

An applicant seeking admission to a master's degree program must meet the requirements outlined in the Admissions section and the department section of this catalog. Prospective students should consult with individual departments for specific requirements.

Course Work Requirements

Graduate committees or program advisors, appointed following admission to a graduate program, will help students prepare their programs of study. The following credit requirements must be met:

1. *Credit Hours.* A student seeking the master's degree must complete a total of at least 30 semester hours of credit (excluding prerequisite courses). See the Credit Policies section of this catalog for information about credits that may not apply toward a graduate degree.
2. *Minor.* If a minor is required as part of a master's degree, a student must:
 - a. Obtain the approval of the department chair of the major and the minor departments.
 - b. Select a graduate faculty member (approved by the department chair of the minor department) to serve as a committee member.
 - c. Register for and complete 9 semester hours of approved graduate credit in the minor.
 - d. Pass an oral or a written comprehensive examination in the minor field (prepared by the minor committee member).
3. *Thesis Credit or Project Credit.* Students in thesis programs must register for and complete a minimum of 6 hours of thesis credit. No more than 6 hours of thesis credit may count as part of the 30-hour minimum. Registration for thesis credit (from 1 to 6 hours per semester approved by the graduate committee chair) and work on the thesis must be concurrent. For students in a project program, at least 2 project credit hours are required.

Time Limit

All master's degrees must be completed within five years of the first semester of enrollment. See the Credit Policies section of this catalog for more detailed information about outdated credits and the time limit.

Full-Time Registration Requirement

In a few approved integrated master's programs, students may earn their baccalaureate and graduate degrees concurrently. Students in such integrated programs must pay graduate tuition for two full-time semesters.

Comprehensive Examination

Many master's programs require comprehensive examinations, which in combination with the defense of the thesis are the culminating experience of the master's degree.

Oral Defense of Theses or Selected Projects

The final oral examination (defense of thesis or selected project) must be scheduled with the Office of Graduate Studies *at least* two weeks in advance. Final examinations may not be held during the interim periods between semesters. All members of the BYU academic community are invited to attend the final oral examination, but only members of the student's graduate committee may question the candidate and vote on the candidate's performance.

An unbound copy of the candidate's thesis or project must be placed in the student's graduate department at least two weeks in advance of the oral examination so that interested faculty and students may review it before the examination.

Examination Results

The committee may vote to "pass," "pass with qualification," "recess," or "fail" the student.

If the decision is to pass with qualification, the committee may require minor revisions of the thesis or selected project, strengthening of the candidate's preparation in subject matter areas, or both. When these qualifications are cleared and the committee chair has properly recorded the clearance with the Office of Graduate Studies, the student is judged to have passed the examination.

If *two or more* examiners vote to recess, the examination is recessed. This permits the candidate to reschedule (with the department and the Office of Graduate Studies) a second and final examination. The new examination cannot be held sooner than a month after the recessed examination.

If *two or more* examiners vote to fail, the examination is failed and the graduate degree program of the student is terminated.

CREDIT POLICIES

Graduate Courses

Seniors with exceptional ability may, on occasion, register for courses numbered in the 500 series but should be aware that such courses are taught at a graduate level and expectations may exceed the undergraduate's preparation.

Appropriate Credit Enrollment

Because graduate study is more rigorous than undergraduate study, a student should not register for more than 12 hours in a semester or 6 hours in a term. In many programs, even that may be too much. Furthermore, registration for thesis and dissertation credit and work on the thesis and dissertation should be concurrent and reasonable. It would be inappropriate, for example, for a student to register for all 18 dissertation credit hours in one semester or term. Students should consult with their committee chair in determining an appropriate and reasonable credit enrollment.

Restrictions on Credits That May Apply Toward a Graduate Degree

Nondegree, Senior, and Transfer Credit

Nondegree, senior, and transfer credit, singly or combined, cannot exceed 10 semester hours of a graduate degree program.

Nondegree Credit. Credit taken after the baccalaureate degree has been received, but before the semester of formal admission to a graduate program, is defined as nondegree credit. Only with department approval can any such credit be considered as part of a graduate degree program.

Senior Credit. In some restricted instances students seeking a master's degree may apply credit taken during the senior year at BYU toward that degree, but in no instances can this credit apply to both a baccalaureate and a graduate degree.

Transfer Credit. Credit taken at other accredited universities in the United States or in Canada may, with department approval, count toward a graduate degree at BYU if the following conditions are met:

1. Any course to be transferred must be clearly graduate level.
2. The grade for any such course must be B or better (pass/fail courses are not transferable).
3. Home study, correspondence, and extension courses are not transferable.
4. Transfer credit in combination with nondegree and senior credit cannot total more than 10 hours.
5. Credit cannot have applied to another degree.

Credit from foreign universities can be considered for transfer only if certified by special examination

(see the Credits Certified by Special Examination section that follows for details).

Other BYU Credit

Lower-division courses (100 and 200 level), Independent Study (correspondence) courses, 300- and 400-level religion courses, and education courses numbered 514R *cannot* apply toward a graduate degree.

No undergraduate courses may apply toward a doctoral degree (except those already applied to a master's degree).

Credits Certified by Special Examination

In rare circumstances, and with the approval of the department and the graduate dean, up to 10 credits may be certified by special examination. For example,

1. A student may wish to transfer normally disallowed graduate credit from a nonaccredited institution or from a foreign university.
2. A student may wish to challenge a course on the study list that covers material already mastered.

Applications to take special examinations may be obtained from the Office of Graduate Studies. For information about special examination fees, see the Tuition and Fees section of this catalog.

Outdated Credit and Time Limits

Only credit taken within the time limit for each degree may count toward the degree (eight years for doctoral degrees and five years for master's degrees). Petitions to extend time limits and include outdated credit are governed by the following:

1. Departments and colleges may petition for up to a one-year extension by providing reasonable evidence that extenuating circumstances caused an unavoidable delay in the student's progress toward a degree.
2. Departments and colleges may petition to allow credit outdated by more than one year but no more than five years to apply toward a degree, but the petition must be accompanied by impressive documentation that the credit in question has been updated by courses retaken, by special readings courses in the subjects outdated, or by examinations in each of the courses.
3. No credit outdated by more than five years may apply to a current degree, regardless of circumstances.

ACADEMIC STANDARDS

Grade Point Average (GPA) Requirements

Graduate students whose graduate (program of study) GPA falls below 3.0 (prerequisite and skill courses are exempt) will not be allowed to graduate and may be dismissed from their graduate programs. Students whose grades frequently fall in the C range or below should consult with their committees about the advisability of continuing graduate study. No D credit may apply toward a graduate degree.

Annual Reviews of Graduate Students

Departments are asked to evaluate the performance of graduate students *at least once a year*; some evaluate more frequently. Students granted provisional admission should expect a review as early as the end of the first semester.

Each department establishes its own evaluation criteria and the standards it requires of graduate students, but generally students can expect to be evaluated on their total academic performance, their fulfillment of program requirements (program of study submitted, courses completed on schedule, prospectus approved by the department, student advanced to candidacy), and their professional performance (including quality of teaching and research). Copies of departmental evaluation criteria are available from individual departments.

Departments rate student performance as satisfactory, marginal, or unsatisfactory, indicating the reasons for a low rating, and inviting the student to respond to the evaluation or to comply with a set of stated conditions for remaining in the program.

Termination of Graduate Status

Termination of graduate status may result if a student:

1. Fails to satisfactorily complete the conditions of acceptance.
2. Fails to fulfill the university's minimum registration requirement.
3. Makes a request to withdraw (with the intent to pursue a degree at another university, for personal reasons, or in response to department recommendation).

4. Receives a marginal or unsatisfactory rating in a periodic review by the academic department and is unable or unwilling to comply with conditions for continuance outlined by the department.
5. Fails to make what the department or the university deems to be satisfactory progress toward a graduate degree.
6. Fails the departmental comprehensive examination.
7. Fails the final oral examination (defense of dissertation, thesis, or selected project).
8. Violates the university's standards of conduct or Honor Code.
9. Exceeds the time limit (five years for master's, eight years for doctoral).

Appeal of Termination

A student dismissed or facing dismissal may respond to or appeal that termination or impending termination. Such responses or appeals should be directed, in writing, to the department chair. A student who wishes further consideration may appeal to the college dean. Ultimately, a final appeal may be made to the university graduate dean who, if circumstances warrant it, may appoint a committee of impartial faculty members to review the matter.

Student Academic Grievances

The university has an established procedure for handling student academic grievances. If consulting with the teacher or the graduate committee chair does not resolve a grievance, a graduate student should describe the problem to the department graduate coordinator and/or the department chair. If difficulties persist, the student may ask the college dean and finally the graduate dean for assistance.

EQUAL OPPORTUNITY OFFICE

D-274 ASB

Provo, UT 84602-1220
(801) 378-6878

Brigham Young University does not allow unlawful discrimination based on race, color, national origin, religion, sex, age, veteran status, or disability in the academic or employment setting. This includes unlawful sexual harassment, which is a violation of university standards as well as state and federal

laws and may be considered grounds for discipline. Persons who believe they have been unlawfully discriminated against or unlawfully sexually harassed should contact the Equal Opportunity Office.

RECORDS

Office of Graduate Studies

B-356 ASB
Provo, UT 84602-1339
(801) 378-4091

The Office of Graduate Studies maintains student records pertinent to graduate study at BYU, including original applications, approved programs of study, and official transcripts received from other universities.

Records Office

B-150 ASB
Provo, UT 84602-1114
(801) 378-2631

The Records Office maintains permanent records of all academic work done at the university. The office is also responsible for issuing official transcripts of credit, which include only courses completed through BYU.

Repeating Classes

When a class is repeated, only the last grade earned counts; the grade point average is computed using the grade and credit hours earned the last time the repeated class was taken.

"R" courses are treated differently. Since an R course is one that may be repeated for credit, it is assumed that the subject matter varies from semester to semester in such a course. Therefore, when an R course is repeated, both grades count; the grade point average is computed using the grades and credit of both classes.

Some graduate programs do not allow students to repeat required graduate courses. Those that do are governed by the following policies:

1. Brigham Young University courses may be repeated unless such courses carry an R suffix (see discussion of R suffix below).
2. A course repeated at an institution other than the one at which it was taken originally will not be counted as a repeated course.

3. Courses taken at another university may be repeated at Brigham Young University, but the appropriate BYU department chair must supply a statement of equivalency.
4. Courses taken at another institution may be repeated there and the credit transferred to Brigham Young University. Students wishing to transfer credit to BYU should consult the Credit Policies section of this catalog because not all transfer courses may count toward a graduate degree.

Transcript Record Holds

A hold is placed on the record of a student who fails to meet university obligations (fees outstanding, university standards violations, traffic tickets, library fines, etc.). No copy of the transcript or information pertaining to it will be released until the obligation is fulfilled.

Confidentiality of Records Policy

The policy of Brigham Young University concerning confidentiality of student academic records reflects a reasonable balance between the obligation of the university for the instruction and welfare of the student and the university's responsibility to society. The university makes every effort to maintain student academic records in confidence by withholding information from individuals who are not authorized to receive it. Faculty and administrative officers who have a legitimate need to use students' records will be allowed access to such records as needed without prior permission from the student. The Confidentiality of Records Policy is detailed in the University Handbook and the BYU Undergraduate Catalog.

FINANCIAL ASSISTANCE

Graduate Awards

BYU offers four types of graduate awards, all through individual departments—assistantships, internships, private scholarships, and supplementary awards. Because teaching and research are vital components of graduate programs, most graduate awards given by Brigham Young University are in the form of teaching and research assistantships and internships. Supplementary awards are tuition scholarships and can only be used to pay the cost of

tuition. Audit credit, credit earned by special examination, or Independent Study may not be paid for by a supplementary tuition award.

Application

New students may apply for graduate awards as part of the regular admission process. Continuing students can obtain information and applications from their departments.

Requirements and Selection

To be eligible for assistantships, internships, or supplementary awards, students must be degree-seeking graduate students in good standing who are registered for at least 2 credit hours in the semester (or 1 credit hour in the term) for which the award is granted. The awards are competitive and generally go to students whose academic performance indicates real merit. All selections are made by academic departments.

Student Loans

Norman B. Finlinson, Director of Student Financial Aid
A-41 ASB
Provo, UT 84602-1009
(801) 378-4104

Two types of student loans are available to graduate students who qualify—BYU loans (short-term, Law School, and Marriott School) and Federal Stafford Loans. Only degree-seeking students who are making satisfactory academic progress will be considered for loan approval.

Application

Application materials and information about eligibility and repayment requirements are available in the Financial Aid Office.

Deadlines

Students must submit all application materials for any BYU need-based loans and federal loans by June 1, 1999.

Student Employment

2024 WSC
Provo, UT 84602-7924
(801) 378-3561

Most student campus jobs other than assistantships and internships are listed at Student Employment Services. Students who are ready to seek employ-

ment should bring proof of acceptance as a full-time student to this office.

Certain governmental restrictions apply to students from foreign countries. Some students are not eligible to obtain work permits until they have been in school for one semester. The International Services Office is able to determine international student status regarding employment.

Federal immigration regulations require everyone hired in the U.S. to prove eligibility to work in America. U.S. citizens do so by presenting a social security card, state-certified birth certificate, or U.S. passport with a current BYU identification card. Non-U.S. citizens need to present a current passport with attached I-94 or I-20 ID.

GRADUATION POLICIES AND INSTRUCTIONS

All Graduate Students

Final Semester Registration

Before applying for graduation, a graduate student should have completed all course work on his or her approved program of study or be currently registered for the remaining requirements. During the final semester, or the semester of final oral and written examinations, a graduate student must either register or pay an equivalent registration fee to the Office of Graduate Studies for at least 2 semester hours of credit. Audit and independent study credits do not count.

Application for Graduation

Graduate students should apply for graduation by the deadlines listed in the University Graduate Studies Calendar on page 12. Applications received after the deadlines will be processed for the next graduation. All students must (1) pay the graduation fee to the Cashiers' Office and (2) formally apply with their department.

After the department has completed its preliminary check and given its approval, the Office of Graduate Studies does a final check. Students will be notified of the results of this evaluation and informed of any problems that need attention.

Graduation Fees

Doctoral candidates	\$25
Master's candidates	\$20
TESOL certificate applicants	\$20

1999–2000 Graduation Deadlines

See the University Graduate Studies Calendar on page 12 for graduation deadlines.

General Caution: The graduation deadlines are firm. Students submitting materials after the deadlines will be candidates for the *next* graduation.

Students in Dissertation, Thesis, and Selected Project Programs

Students in selected project programs must meet the same requirements as students in dissertation and thesis programs with regard to the scheduling of the final oral defense, the composition of the graduate committee, and the standards and format of the major written work. The following departments offer selected project programs: Agronomy and Horticulture, Botany and Range Science, Instructional Psychology and Technology, Nursing, School of Technology, Theatre and Media Arts, Visual Arts, and Zoology.

Format Requirements

Colleges and departments, not the Office of Graduate Studies, are responsible for both the content and the format of dissertations, theses, and selected projects. These works are expected to meet the highest standards of excellence in substance and in appearance. The graduate dean and the Graduate Council, in its review of graduate programs, select dissertations, theses, and projects for reading and review.

Requirements regarding the number of copies to be submitted and the format of the title page, graduate committee approval page, abstract, etc., are described in a handout available from either the department or the Office of Graduate Studies.

Scheduling the Oral Defense

All students in dissertation, thesis, or selected project programs must schedule the final oral examination *at least two weeks* in advance. Final examinations may not be held during the interim periods between semesters.

Copy of Work Placed in Library

All members of the BYU academic community are invited to attend the final defenses of dissertations and theses. Therefore, all students in dissertation, thesis, or selected project programs are required to place an unbound copy of their work in their department at the time the final oral examination is scheduled (two weeks in advance of the oral defense) to enable interested faculty and students to review it before the examination.

Final Copies

Ample time should be allowed for making corrections to the work after the final oral defense and before the deadline for submitting final copies to the library (December 10, 1999, for December 1999; March 24, 2000, for April 2000; and July 14, 2000, for August 2000).

Commencement and Convocation

All candidates for graduation are invited to participate in the university's commencement and convocation exercises in either April or August (students completing degrees in December are invited to participate in the following April's commencement activities). Master's and doctoral candidates are individually recognized in their respective college convocation exercises.

Honor Designations

No honor designations are given upon conferral of advanced degrees. Various honor societies, however, may nominate graduate students for membership.

Diplomas and Transcripts

Diplomas are mailed to graduates from six to eight weeks after graduation. Receipt of the degree is recorded on the student's official transcript within one month after graduation, and a complimentary copy of the transcript is mailed with the diploma.

Letter of Completion

After a graduate student has completed all the requirements for graduation, the Office of Graduate Studies can furnish a letter of completion if the student requests it. This document certifies that the student has satisfied all the requirements for the degree and confirms that the degree will be conferred.

CAMPUS FACILITIES AND SERVICES

CULTURAL AND RECREATIONAL RESOURCES

One of the cultural centers of the intermountain region, Brigham Young University offers a wealth of opportunities for students and community members interested in the cultural arts. It is the home of four major museums—the Museum of Art, the Monte L. Bean Life Science Museum, the Earth Science Museum, and the Museum of Peoples and Cultures.

In addition to maintaining a variety of theatres, concert halls, and art galleries for study and performance in drama, music, dance, and the visual arts, BYU sponsors performing arts series that bring to the campus some of the world's most acclaimed musicians. Other offerings include the Honors Program cultural arts series and the International Cinema, which shows foreign films weekly. Moreover, BYU is associated with a professional motion picture studio and an educational television station and FM radio station that broadcast a wide spectrum of programs.

Of prime importance are the general devotional assemblies and forums, which draw together the entire campus to be addressed by prominent Church and national figures. BYUSA-sponsored lectures and college- and department-sponsored lectures by noted scholars also enhance learning.

BYU has an exceptional athletic program, which has achieved national prominence in recent years in men's basketball, football, and golf and women's volleyball and tennis. The Marriott Center, one of the largest on-campus indoor arenas in the nation, seats 23,000; and the football stadium seats 65,000. Opportunities abound for the participant as well as the spectator through BYU's large intramural program, in which thousands of students participate in more than 60 different events. BYU also has an extensive extramural program in sports such as lacrosse, softball, and soccer.

Situated at the foot of the Wasatch Mountains, BYU offers students a wealth of outdoor recreational

opportunities, including some of the best skiing and hiking in the world. Furthermore, Utah's vast desert wilderness and canyon country begins just a few hours from the campus.

Forty-five miles north of Provo is Salt Lake City, home of numerous theatrical, dance, and musical groups, among them Ballet West and the Utah Symphony.

CAMPUS SERVICES OF INTEREST TO GRADUATE STUDENTS

Most academic services for graduate students are provided at the departmental level; therefore, the following items present only the most general information. Information related to specific interests, such as employment in a particular department, is available in individual departments.

CAMPUS PRIVILEGES FOR GRADUATE STUDENTS

Graduate students who are registered for at least 2 hours per semester or 1 hour per term receive a university activity card (ID card) and are eligible for all on-campus privileges afforded students who are registered full-time, i.e., eligibility for on-campus employment, student housing, student insurance, intramurals, use of physical education facilities, graduate parking permits, and discount admission to sporting and cultural events. Students enrolled in the executive management programs, EMBA and EMPA, are ineligible. However, for a fee of \$30 per semester the physical education facilities are available.

ID CENTER

2310 WSC
Provo, UT 84602-7908
(801) 378-5092

The ID Center provides BYU photo identification cards to BYU students. These cards allow students

the campus privileges described above. During the first two weeks of each semester or term, the photo ID cards are produced in a designated place in the Wilkinson Center. Thereafter, cards are available at the ID Center. All ID distribution locations also serve as screening areas for the dress and grooming standards outlined by the university.

INFORMATION TECHNOLOGY SERVICES

Executive Director: Kelly C. McDonald
167 TMCB
Provo, UT 84602-6540
(801) 378-5025

Offering consultation and wide-ranging technology expertise, Information Technology Services provides support to faculty, staff, students, and administration for academic, Church, and entertainment activities. To place orders or consult about products, services, repairs, or operational help, call (801) 378-4000.

Included in the services offered are the following:

- **Computing Support.** Services include access to networks, file server operations, desktop leasing, campus e-mail accounts, Route Y offerings, and support of CSRs.
- **Voice and Data Communications.** These services include all telephones, pagers, radios, cell phones, long-distance services, and data lines.
- **Classroom Media Support.** IT Services provides campus cable television services, video preview services, a video library, and delivery and setup of classroom technology for teaching.
- **Campus Event Support.** Activities requiring sound reinforcement, artistic lighting, or video recording or playback are supported by IT Services. Such events include intercollegiate athletic events, touring group technical support, BYUSA activities, classroom videotaping, and more.
- **Technology Maintenance.** Repair and preventative maintenance services for all of the technology offered by IT Services is also provided. Technicians perform both on-site and bench repairs.
- **Training Support.** Those receiving products and services can also receive training in the use and operation of these technologies.
- **Engineering and Design Support.** Often technology products and services must be customized for use by a particular customer or within a spe-

cific venue. Engineering and design work for these needs is provided by IT Services.

- **Web-Based Access.** The products and services of the organization can be accessed through our Web page: itservices.byu.edu.

VETERANS SUPPORT OFFICE

B-150 ASB
Provo, UT 84602-1113
(801) 378-2768

The Veterans Support Office certifies the enrollment of eligible veterans or their dependents for educational benefits from the Veterans Administration. Information and assistance in applying for these benefits are available from this office.

RELIGIOUS OPPORTUNITIES

Students have many excellent opportunities to participate in religious activities at BYU.

BYU Wards and Stakes

The Church of Jesus Christ of Latter-day Saints is organized on campus into a number of stakes composed of several wards of 150 to 175 members each. The stakes and wards are organized specifically to give individuals maximum opportunity for Church activity. Spiritual growth and a strong testimony of the divinity of Jesus Christ are goals fostered by the campus stake and ward organizations, whose programs are correlated at all levels with the activities of the university.

All single students living away from home who are members of The Church of Jesus Christ of Latter-day Saints become members of one of the BYU wards. Married students not living in university housing may attend either a BYU ward or the city ward in which they live.

Other Religious Denominations

Approximately 25 other religious denominations are represented by BYU students. These students are encouraged to attend the congregation of their faith in the Provo area.

Devotionals, Forums, and Firesides

Each Tuesday at 11 a.m., General Authorities, other Church leaders, faculty, or special university guests speak to general devotional assemblies or forums of faculty and students in the Marriott Center. Their

STUDENT LIFE

messages encourage education, commitment, faith, and adherence to Church standards. Once a month in the Marriott Center, usually the first Sunday evening, Church leaders speak to students in services sponsored by the Church Educational System. Many of these fireside services are broadcast live on the Church satellite television network to Institutes of Religion throughout the United States and Canada.

STUDENT LIFE

Opportunities and services available through Student Life are many and varied, ranging from student (BYUSA) functions and activities to personal and career counseling, placement, health, housing, dining, and security services.

Student Life Vice President: Alton L. Wade, A-333

ASB, Provo, UT 84602-1332, (801) 378-2387

Assistant Student Life Vice President and Dean of

Students: Janet S. Scharman, 3500 WSC, Provo, UT 84602-5542, (801) 378-4668

Assistant Vice President—Student Auxiliary Services:

David A. Hunt, 301 SASB, Provo, UT 84602-1800, (801) 378-3868

Director, Counseling and Career Center: Ronald K.

Chapman, 1500 WSC, Provo, UT 84602-5548, (801) 378-3035

Administrative Director, Student Health Services: Val

Christensen, 168 MHC, Provo, UT 84602-4800, (801) 378-7443

Managing Director and Chief of Police: Robert W.

Kelshaw, B-66 ASB, Provo, UT 84602-1008

DEAN OF STUDENTS

3500 WSC

Provo, UT 84602-5542

(801) 378-4668

Student Leadership

3400 WSC

Provo, UT 84602-7903

(801) 378-3901

The mission of Student Leadership is to strengthen students in their social relationships, civic duty, and service to mankind. Through student leadership, the university community works together to achieve our

goals that all who "enter to learn" will be prepared by training and experience to "go forth to serve."

There are five main areas within Student Leadership. **BYUSA** consists of elected and appointed student body officers, program directors, and volunteers who oversee campus activities and clubs. The Student Advisory Council (SAC) is under the direction of a BYUSA vice president and consists of student representatives, either elected or appointed, from each college on campus and from various special interest groups. A major focus of BYUSA is to unite the campus community and to increase communication with the administration. The **Programming Team** plays a major role in New Student Orientation, parts of Homecoming, and yearly special events such as the President's Christmas Party, ethnic weeks, disability awareness, etc. The **BYU Student Leadership Seminar** is open to all students, and it provides a weekly group leadership training meeting and small-group mentoring sessions. The **Campus Involvement Center**, located near the terrace in the WSC, provides students with information about involvement opportunities.

Tutoring Services provides academic assistance for students through peer tutoring.

All Brigham Young University students are invited to participate in or help plan many of the numerous programs and activities that are available through Student Leadership. For more information, contact the office secretaries at the number listed above.

Ombudsman

BYUSA, 3400 WSC

Provo, UT 84602-7908

(801) 378-4132

The Ombudsman's Office investigates and expresses conclusions when a student is aggrieved by an official's action or inaction and acts as an impartial mediator in resolving disputes between students and businesses, organizations, or individuals. Basic legal advice is also provided by this office.

Student Honor Association

Coordinator: Jeannie Papic
(801) 378-4667
President: Thomas Chock
(801) 378-3758
4414 WSC
Provo, UT 84602-7910

The Student Honor Association, a department of Student Live, has the specific purpose of encouraging character development among the campus community. It has a staff of one administrator, twelve employed students, and an ever-growing pool of volunteers.

Mission statement: To inspire individual students, empowered by a spirit of honor, to lead with strong moral character.

We accomplish this by

- Being an example in word and deed
- Encouraging students, staff, and faculty in principles of honor
- Strengthening existing commitments to Christ-centered principles
- Promoting principles of honor through activities and service
- Developing leadership in student volunteers

International Services

Director: Enoc Flores
1351 WSC
Provo, UT 84602-7917
(801) 378-2695

This office provides visa support, advisement, and services to all international students, visitors, and exchange scholars; aliens with permanent residence in the United States; and other interested parties within the university community.

Multicultural Student Services

Director: Vernon Heperi
1320 WSC
Provo, UT 84602-7908
(801) 378-3065

Multicultural Student Services publishes the *Eagle's Eye*, supports the Living Legends, and helps American minority students succeed in college work by providing the following support services:

1. **Academic Support.** The office offers personal encouragement and academic advisement to all American minority students.
2. **Financial Aid.** The office assists American minority students in securing financial aid.

Services for Students with Disabilities

Director: Paul Byrd
1520 WSC
Provo, UT 84602-7920
(801) 378-2767 v/TTY

BYU offers a variety of services for students with physical or learning disabilities on application for services. Hearing-impaired students have access to classroom interpreters, Com-Teks, and TTY communications. Visually impaired students have access to volunteer readers, Visualteks, a talking computer with enlarged screen print, taped textbooks, and braille writers. Mobility-impaired students may receive help with arranging access to buildings on campus and note-taking services. Learning-disabled students may be helped by free assessment, volunteer readers, taped textbooks, and other appropriate services. Support groups for learning disabilities, ADHD, and chronic pain and illness are available.

Women's Services and Resources

Coordinator: LaNae Valentine
1526 WSC
(801) 378-4877

Women's Services and Resources, a department of Campus Life, is a comprehensive support and referral source for all BYU campus women (students, staff, faculty, spouses). Individualized help in finding and utilizing needed services and programs sponsored by the WSR, the university, and community agencies is provided.

Specific information and support is available for re-entry and single parent students (male and female).

COUNSELING AND CAREER CENTER

Director: Ronald K. Chapman
2514 WSC
Provo, UT 84602-7906
(801) 378-4007

The Counseling and Career Center provides counseling, instruction, and support to full-time students, including the following:

- Academic support
- Career counseling and information
- Open major advisement
- Personal and group counseling
- 24-hour emergency services
- Career placement services

STUDENT AUXILIARY SERVICES

Web address: www.byu.edu/stlife/sas

Bookstore

The BYU Bookstore offers a variety of academic and convenience merchandise for sale at competitive prices.

The Bookstore offers such services as check cashing, money orders, travelers checks, UTA monthly bus passes, special orders for books and merchandise, gift wrapping, packaging/shipping and mailing services, photo processing, and video and video equipment rentals.

The Bookstore is open Monday through Friday from 7:50 a.m. to 6:00 p.m. and Saturday from 10:00 a.m. to 6:00 p.m. The Twilight Zone convenience store is open Monday through Friday from 7:30 a.m. to 9:30 p.m. and Saturdays from 9:30 a.m. to 6:00 p.m. For further information call (801) 378-2400.

Ernest L. Wilkinson Student Center

The newly remodeled and expanded Ernest L. Wilkinson Student Center (WSC) serves as the gathering place for the university, a place to relax—the center of college community life. The WSC is a place where students can come to participate in out-of-class activities that foster balanced growth in a clean, modern facility and a safe, pleasant environment. Many student services have conveniently relocated to the Wilkinson Student Center, and a diversity of programs and activities there complements learning. Data connections to support personal computer access are now in most lounges.

The building opens at 6 a.m. seven days a week and closes at 11 p.m. Monday–Thursday, midnight on Friday, 11:30 p.m. on Saturday, and 10 p.m. on Sunday. Listed below are WSC businesses and services.

First Floor: Outdoors Unlimited (rental, sales, repairs, and programs), Games Center, Post Office, Campus Craft and Floral, Cougar Creations (copy center), Barbershop, Lost and Found, Computer Lab, Multicultural Student Services, International Services, Services for Students with Disabilities, Women's Services and Resources, counseling offices, several lounges, and a vending area.

Second Floor: Ballrooms, Garden Court, Memorial Hall, Terrace, Varsity Theatre, Zuka Juice, Bookstore, Cougar Food Court, Information Center, ID Center, Campus Involvement Center, Counseling and Career Center, Student Employment, Campus Scheduling, WSC Dining Services, and Off-Campus Housing.

Third Floor: Offices for the dean of students, Student Leadership, Student Leadership Tutoring, ELWSC Administrative and Business Support offices, Student Life Computer Support Services, conference rooms, lounge, and access to the Bookstore.

Fourth Floor: Honor Code offices, Student Honor Association, and Faculty Center.

Fifth Floor: The *Daily Universe* (BYU's student newspaper), NEWSNET (student media organization), and KBYU news broadcasting facilities.

Sixth Floor: Skyroom Restaurant.

Housing

Housing Business Office

100 SASB
Provo, UT 84602-1820
(801) 378-2611
Fax: (801) 378-6939
E-mail: housing@byu.edu
Web: www.byu.edu/stlife/sas/hs

Student housing is available both on campus and in the surrounding communities; policies have been established within campus residence halls and with off-campus landlords to integrate living experiences with the complete educational experience.

Campus Housing: Single Students

Campus housing for single students includes room-and-board residence halls and apartment-type facilities.

Room and Board. Deseret Towers and Helaman Halls are room-and-board facilities for men and women. Residents of these complexes have access to math labs, reading/writing tutors, computer facilities, and health and wellness counseling. Each complex has all-you-care-to-eat dining rooms, a snack bar, a lounge with a large-screen TV, and administrative offices. Laundry and storage facilities, linen service, piano rooms, and a basement kitchenette are available in each hall. Helaman Halls has a limited number of expanded rooms with sinks and some suites for women. A swimming pool, basketball and sand volleyball courts, and large lawn areas are also available.

Apartment Style. Heritage Halls offers apartment-style living for both women and men. The one-, two-, and three-bedroom apartments have a bathroom and a kitchen/dining area with a microwave and dishwasher. Each hall has large lounge areas, a recreation room, and laundry and storage facilities. A computer lab, multipurpose activity rooms, a homemaking resource center, and administrative offices are located at the Heritage Halls Central Building. Sports courts, sand volleyball courts, large patios, and barbecue facilities are also available.

The Foreign Language Student Residence provides single students with hands-on experience while refining their language skills. Residents in each apartment study the same language and agree to speak only that language within their living quarters. A native speaker in each apartment provides language assistance, and in-room cable programs supply additional language training. Residents of similar languages participate in five evening meals per week, with the cost of these meals included in the complex's fees. Each apartment is completely furnished, including a dishwasher, microwave, table and chairs, couch and chairs, television, and VCR. Large lawn areas and sports courts are also available.

Campus Housing: Student Families

Accommodations for 1,324 student families are provided at Wymount Terrace and Wyview Park, and each apartment is furnished with an electric or gas range, refrigerator, blinds, and garbage disposal.

A limited amount of rental furniture is available from the Student Family Housing Office. Sports courts, access to the Deseret Towers and Helaman Halls swimming pools, children's playgrounds, and large lawn areas are also available. These apartments do not have washer/dryer hookups, but they do have self-service laundry facilities. A dairy products outlet is located at both Wymount Terrace and Wyview Park, and the Housing Office at Wymount Terrace has a computer lab.

Wymount Terrace is located on the northeast side of campus and has 898 one-, two-, and three-bedroom apartments. Wyview Park is located northwest of campus on University Avenue and has 426 two- and three-bedroom apartments.

Applications/Agreements for Campus Housing

Students who plan to enroll at BYU and live in a university residence hall or a student family housing complex are advised to obtain the appropriate application/agreement from the Housing Business Office at least one year in advance. For single student housing, the completed agreement must be returned with a nonrefundable \$50 application fee and a \$100 security deposit. For student family housing, the completed application must be returned with a nonrefundable \$25 application fee. Placement into on-campus housing is made according to the date the application or agreement is received by the Housing Business Office. Acceptance into on-campus housing is not a commitment of admission to the university.

Off-Campus Housing

2170 WSC

Provo, UT 84602-7909

(801) 378-5066

Web address: www.byu.edu/offcampushousing

The BYU Off-Campus Housing Office aids students in finding off-campus housing, encourages landlords of university-approved housing to maintain and improve rental facilities, advises students and landlords in their relationships with one another, and attempts to assure that BYU living standards are maintained in university-approved off-campus rentals. BYU graduate students are encouraged, but not required, to live in university-approved housing. At present, more than 19,000 rental spaces have been approved by the university for off-campus living.

BYU Housing Referral Service

The Off-Campus Housing Office maintains a complete referral service for all university-approved rental facilities. Thousands of rental units of all types are available, including large apartment complexes, condominiums, duplexes, houses, basement apartments, and sleeping rooms. Some housing for student families is also listed, though family student housing is not subject to university approval.

Detailed lists of current vacancies are available at the Off-Campus Housing Office from 8 a.m. to 5 p.m. Monday through Friday. The "Housing Hotline" provides daily updates of newly listed vacant rentals—call (801) 378-3440. Listings are also available at our Web site (listed above). A guide with essential rental data on the large apartment complexes will be mailed on request. Consultants are also available to help students who have problems finding suitable off-campus housing.

STUDENT HEALTH CENTER

Director: Val H. Christensen
2329 SHC
Provo, UT 84602-4800
(801) 378-2771

Student health services are available to all students at the Student Health Center. Hospitalization, when necessary, is available locally at the Utah Valley Regional Medical Center. The Health Center offers urgent care, consultation with physicians by appointment, immunizations, pharmacy service, physical therapy, laboratory tests, and X-ray examinations. Also, a brochure describing student health and insurance plans is available at the Health Center.

UNIVERSITY POLICE

B-66 ASB
Provo, UT 84602-1008
(801) 378-2222 (Emergency: 911)

The University Police Department is established for the benefit and protection of students, faculty, and staff. The department's state-certified police officers are entrusted with enforcing laws and campus rules and regulations.

All matters requiring police assistance on campus should be directed to this office.

Parking and Traffic Services

PTSB
Provo, UT 84602-0300
(801) 378-3906

Vehicle Registration and Parking Permits

Parking and traffic control are the responsibility of the University Police Parking and Traffic Services, located in the building east of the Carillon Bell Tower on 1430 North. All BYU students who intend to park in student lots during restricted hours must register their motor vehicles with the Parking Division and obtain a parking permit.

To purchase a permit, students should bring their current vehicle registration, proof of emissions compliance, and BYU ID to the Traffic Office.

A limited number of parking spaces near the Law School and the Marriott School have been designated as "G-Parking" lots. Graduate students are given priority in purchasing permits for these lots. The permits do not guarantee a parking space but allow a student to park in the designated lot when space is available. Issued at a ratio of 1.75 for each G stall, the permits cost \$40. Permits for other parking spaces are available for \$15 (Y permit) or \$5 (R permit). For more information about the procedures and application deadlines for obtaining a G permit, students can contact the Office of Graduate Studies, the Parking and Traffic Services Office, or their department.

Faculty and staff employees with out-of-state plates must license their vehicles with the state of Utah and clear them for tax payment before they can receive their parking permits.

Bicycle Registration

All bicycles that are operated, parked, or stored on campus by any student, employee, or visitor must display a current bicycle license from a Utah County city. The fee for a Provo bicycle license is \$1. Provo City bicycle licenses can be obtained at the Traffic Office.

Bicycles may not be ridden on the main campus during class breaks. To avoid impoundment and damaged locks, bicycles must be parked in authorized bicycle racks. Bicycle locks, chains, or cables may not be cut unless a uniformed police officer or traffic officer is present. BYU is not responsible to replace cut or damaged locks, cables, or chains.

Other Regulations and Information

Owner/Operators of motor vehicles operated in Utah County should be prepared to pass Utah County Vehicle Emissions Inspection Maintenance requirements.

Neighborhoods adjoining campus are sometimes inundated with parked vehicles. Students are encouraged to obtain BYU parking permits and to

park in university parking lots authorized by the permit.

Traffic regulation information may be obtained from the Parking and Traffic Services Office. It is the responsibility of all students, faculty, and staff members to obey all traffic rules and regulations.

Questions may be directed to the Parking and Traffic Services Office personnel at (801) 378-3906.

CATALOG TERMS AND ABBREVIATIONS

The following terms and abbreviations are used throughout the catalog.

Course Number. This catalog does not list courses numbered below 500. For listings of undergraduate courses, see the BYU Undergraduate Catalog. Courses numbered below 500 are undergraduate courses, courses numbered 500–599 are either graduate courses or advanced undergraduate courses, and courses numbered 600 and above (600–799) are graduate courses. Most, but not all, 500-level courses can count toward a graduate degree. Restrictions and limitations are noted in the Credit Policies section of this catalog and also in the program requirements for each department.

R. An R following the course number designates a course that may be repeated for credit.

Credit Hour Designation. The number that follows each course title is the number of semester hours of credit designated for the class.

Areas of Study	Abbreviations
Accounting	Acc
Agronomy and Horticulture	AgHrt
Animal Science	AnSc
Anthropology	Anthr
Audiology and Speech-Language Pathology	ASLP
Botany and Range Science	Botny, Range
Chemical Engineering	ChEn
Chemistry and Biochemistry	Chem
Civil and Environmental Engineering	CEEn
Communications	Comms
Computer Science	CS
Counseling Psychology and Special Education	CSE
Dance	Dance
Economics	Econ
Educational Leadership and Foundations	EdLF
Electrical and Computer Engineering	ECEn
English	Engl

School of Family Life	
Marriage and Family Therapy	MFT
Marriage, Family, and Human Development	MFHD
Food Science and Nutrition	FSN
Geography	Geog
Geology	Geol
Health Sciences	Hlth
History	Hist
Humanities	Hum
Classics	Clscs
Comparative Literature	CmLit
Instructional Psychology and Technology	IP&T
International and Area Studies	IAS
Languages	
Arabic	Arab
Chinese	Chin
French	Fren
German	Germ
Hebrew	Heb
Italian	Ital
Portuguese	Port
Russian	Russ
Scandinavian	Scand
Spanish	Span
Law School	Law
Linguistics	Ling
Teaching English to Students of Other Languages	ESL
Management	Mgt
Mathematics	Math
Mechanical Engineering	MeEn
Microbiology	Mcbio
Music	Music
Nursing	Nurs
Organizational Leadership and Strategy	OrgB
Philosophy	Phil
Physical Education	PE
Physics and Astronomy	Phscs
Psychology	Psych
Public Management, Institute of	PMgt

Public Policy	PPol	School of Technology	
Recreation Management and Youth Leadership	RMYL	Construction Management	CM
Religious Education		Electronics Engineering	
Ancient Scripture	RelA	Technology	EET
Church History and Doctrine	RelC	Manufacturing Engineering	
Social Work	SocW	Technology	Mfg
Sociology	Soc	Technology Teacher Education	TTE
Statistics	Stat	Technology	Tech
Teacher Education		Theatre and Media Arts	TMA
Elementary Education	ElEd	Visual Arts	
Secondary Education	ScEd	Art History and Curatorial	
		Studies	ArtHC
		Visual Arts Education	VAEdu
		Visual Arts Studio	VAStu
		Zoology	Zool

COLLEGES, SCHOOLS, AND INTERDISCIPLINARY PROGRAMS

COLLEGE OF BIOLOGY AND AGRICULTURE

301 WIDB
Provo, UT 84602-5250
(801) 378-3963

Dean: R. Kent Crookston, Professor, Agronomy and Horticulture

Associate Dean: Mark J. Rowe, Professor, Food Science and Nutrition

Associate Dean, Graduate Studies: Richard R. Tolman, Professor, Zoology

The departments in the College of Biology and Agriculture offer the following graduate degrees:

Agronomy and Horticulture

MS Agronomy
MS Horticulture

Animal Science

MS Animal Science

Botany and Range Science

MS Biological Science Education
MS, PhD Botany
MS Range Science
MS, PhD Wildlife and Range Resources

Food Science and Nutrition

MS Food Science
MS Nutritional Science

Microbiology

MS, PhD Microbiology

Zoology

MS Biological Science Education
MS, PhD Zoology

PhD and MS degrees in molecular biology are also offered in the College of Biology and Agriculture. See listing under the Molecular Biology section of this catalog for program requirements.

DAVID O. MCKAY SCHOOL OF EDUCATION

343 MCKB
Provo, UT 84602-5095
(801) 378-3694

Dean: Robert S. Patterson, Professor, Educational Leadership and Foundations

Assistant Dean: Sally M. Todd, Associate Professor, Counseling Psychology and Special Education

The departments in the McKay School of Education offer the following graduate degrees:

Audiology and Speech-Language Pathology

MS Audiology
MS Speech-Language Pathology

Counseling Psychology and Special Education

MS Counseling and School Psychology
MS Special Education
PhD Counseling Psychology

Educational Leadership and Foundations

MEd, EdD, PhD Educational Leadership

Instructional Psychology and Technology

MS, PhD Instructional Psychology and Technology

Teacher Education

MA, MEd Teaching and Learning
EdD Reading

COLLEGE OF ENGINEERING AND TECHNOLOGY

270 CB
Provo, UT 84602-1345
(801) 378-4326

Dean: Douglas M. Chabries, Professor, Electrical and Computer Engineering

Associate Dean, Curriculum and Undergraduate Studies: Jordan Cox, Associate Professor, Mechanical Engineering

Assistant Dean, External Relations: David K. Anthony

The departments and school in the College of Engineering and Technology offer the following graduate degrees:

Chemical Engineering

MS, PhD Chemical Engineering

Civil and Environmental Engineering

MS, PhD Civil Engineering

Electrical and Computer Engineering

MS, PhD Electrical Engineering

Mechanical Engineering

MS, PhD Mechanical Engineering

Technology, School of

MS Engineering Technology

MS Technology Education

COLLEGE OF FAMILY, HOME, AND SOCIAL SCIENCES

990 SWKT
Provo, UT 84602-5535
(801) 378-2083

Dean: Clayne L. Pope, Professor, Economics

Associate Dean, Graduate Studies and

Curriculum: Paul B. Pixton, Professor, History

Associate Dean, Research and Faculty

Development: Dennis L Thomson, Professor, Political Science

Associate Dean; Director, School of Family Life:

James M. Harper, Professor, Family Life

The departments and schools in the College of Family, Home, and Social Sciences offer the following graduate degrees:

Anthropology

MA Anthropology

Family Life, School of

MS, PhD Family Sciences and Human Development

MS, PhD Marriage and Family Therapy

Geography

MS Geography

History

MA, PhD History

Psychology

PhD Clinical Psychology

MS, PhD Psychology

Social Work, School of

MSW Social Work

Sociology

MS, PhD Sociology

COLLEGE OF FINE ARTS AND COMMUNICATIONS

A-410 HFAC
Provo, UT 84602-5250
(801) 378-2818

Dean: Bruce L. Christensen, Professor,
Communications

Associate Dean, Graduate Studies: K. Newell
Dayley, Professor, Music

The departments and school in the College of Fine Arts and Communications offer the following graduate degrees:

Communications

MA Mass Communication

Music, School of

MA, MM, PhD Music

Theatre and Media Arts

MFA Theatre, Design, and Technology

MA, PhD Theatre and Film

Visual Arts

MA Art Education

MA Art History and Curatorial Studies

MFA Studio Art

COLLEGE OF HEALTH AND HUMAN PERFORMANCE

212 RB
Provo, UT 84602-2113
(801) 378-2645

Dean: Robert K. Conlee, Professor, Physical
Education

Associate Dean, Graduate Studies: Joyce M.
Harrison, Professor, Physical Education

Associate Dean: Jay H. Naylor, Professor,
Recreation Management and Youth Leadership

The departments in the College of Health and Human Performance offer the following degrees:

Dance

MA Dance

Health Sciences

MS Health Sciences

Physical Education

MS Physical Education

PhD Curriculum and Instruction in Physical
Education

PhD Exercise Science

Recreation Management and Youth Leadership

MS Youth and Family Recreation

COLLEGE OF HUMANITIES

2054 JKHB

Provo, UT 84602-6001

(801) 378-2775

Dean: Van C. Gessel, Professor, Asian and Near Eastern Languages

Associate Dean, Graduate Studies: Melvin J. Luthy, Professor, Linguistics

Associate Dean: John R. Rosenberg, Professor, Spanish and Portuguese

The departments in the College of Humanities offer the following graduate degrees:

English

MA English

French and Italian

MA French Studies

Germanic and Slavic Languages

MA German Literature

Humanities, Classics, and Comparative Literature

MA Comparative Literature

MA Humanities

Linguistics

MA Linguistics

MA Teaching English to Speakers of Other Languages

Cert Teaching English to Speakers of Other Languages (TESOL Certificate)

Spanish and Portuguese

MA Portuguese

MA Spanish

The Collegewide Language Acquisition Program offers an MA with specializations in the following languages:

Arabic	German	Portuguese
Chinese	Japanese	Russian
French	Korean	Scandinavian

J. REUBEN CLARK LAW SCHOOL

348-A JRCB

Provo, UT 84602-8001

(801) 378-4274

Dean: H. Reese Hansen

Associate Dean: J. Clifton Fleming, Jr.

Associate Dean: Constance K. Lundberg

Associate Dean: Scott W. Cameron

Assistant Dean: Kathy D. Pullins

Juris Doctorate (JD)

The J. Reuben Clark Law School offers a six-semester course of graduate professional study leading to the juris doctorate (JD) degree. Information about legal education, admissions standards and procedures, and related matters can be obtained from the J. Reuben Clark Law School Bulletin, which is available through the admissions office of the Law School.

Master of Laws (LLM)

The master of laws (LLM) degree is conferred upon successful completion of a minimum 24 credit hours earned during at least two semesters in residence following completion of a JD degree or its equivalent outside the United States. Information and applications are available through the admissions office of the Law School, 340 JRCB, Provo, UT 84602-8001.

MARRIOTT SCHOOL

730 TNRB

Provo, UT 84602-3113

(801) 378-4121

Dean: Ned C. Hill, Professor, Business Management

Associate Dean: W. Steve Albrecht, Professor, Accounting

Associate Dean: Lee Tom Perry, Professor, Organizational Leadership and Strategy

The Marriott School offers both undergraduate and graduate programs. The Graduate School of Management comprises five professional programs:

Master of Accountancy

Master of Business Administration

Master of Information Systems Management

Master of Organizational Behavior

Master of Public Administration

COLLEGE OF NURSING

593 SWKT
Provo, UT 84602-5532
(801) 378-4144

Dean: Sandra Rogers, Associate Professor, Nursing
Associate Dean, Curriculum: Lynn Callister,
Associate Professor, Nursing
Associate Dean, Student Affairs: Mary Williams,
Associate Professor, Nursing
Associate Dean, Scholarship: Elaine Sorensen
Marshall, Associate Professor, Nursing

The College of Nursing offers a nationally accredited program leading to the master of science degree. Areas of specialization include Family Nurse Practitioner and Health-Care Systems Administration.

COLLEGE OF PHYSICAL AND MATHEMATICAL SCIENCES

1147 TMCB
Provo, UT 84602-4578
(801) 378-2674

Dean: Bill R. Hays, Professor, Computer Science
Associate Dean: Nolan F. Mangelson, Professor,
Chemistry and Biochemistry
Associate Dean: Larry C. Christensen, Professor,
Computer Science

The departments in the College of Physical and Mathematical Sciences offer the following graduate degrees:

Chemistry and Biochemistry

MS, PhD Biochemistry
MS, PhD Chemistry

Computer Science

MS, PhD Computer Science

Geology

MS Geology

Mathematics

MA, MS, PhD Mathematics

Physics and Astronomy

MS, PhD Physics
PhD Physics and Astronomy

Statistics

MS Statistics

RELIGIOUS EDUCATION

370 JSB
Provo, UT 84602-5693
(801) 378-2735

Dean: Robert L. Millet, Professor, Ancient Scripture
Associate Dean: Paul Y. Hoskisson, Associate
Professor, Ancient Scripture
Associate Dean: Brent L. Top, Associate Professor,
Church History and Doctrine

Religious Education offers graduate minors but not graduate majors. See the Department of Ancient Scripture and the Department of Church History and Doctrine in the Religion section of this catalog.

INTERDISCIPLINARY PROGRAMS

DAVID M. KENNEDY CENTER FOR INTERNATIONAL STUDIES

237 HRCB
Provo, UT 84602-4537
(801) 378-3379

Director: Donald B. Holsinger, Professor,
Educational Leadership and Foundations
Associate Director for Graduate Studies: Phillip J.
Bryson, Professor, Marriott School
Assistant Director: Jeffrey F. Ringer, Lecturer,
Political Science

The interdisciplinary program offers the following graduate degree:

International and Area Studies

MA International and Area Studies

PUBLIC POLICY

366 SWKT
Provo, UT 84602-5545
(801) 378-7146

Graduate Coordinator: Gary Bryner, Professor,
Political Science

The interdisciplinary program offers the following graduate degree:

Public Policy

MA Public Policy

ACADEMIC DEPARTMENTS, DEGREES, AND COURSES

SCHOOL OF ACCOUNTANCY AND INFORMATION SYSTEMS

Director: Lee H. Radebaugh
Associate Director: Robert L.
Gardner

560 TNRB
Provo, UT 84602-3068
(801) 378-4235
Fax: (801) 378-5933
E-mail: macc@byu.edu
Internet: <http://msm.byu.edu>

THE PROGRAM OF STUDIES

The School of Accountancy and Information Systems administers two graduate programs through the Marriott School: the Master of Accountancy—MAcc; and the Master of Information Systems Management—MISM

The Master of Accountancy (MAcc) Program offers a general background in accounting, with an emphasis on business-related subjects and an in-depth study of one or more areas of accounting. The MAcc degree is awarded on completion of a professional program, which can begin as early as the junior year of the undergraduate program, and culminates in the Marriott School after the fifth year. Students entering the School of Accountancy and Information Systems Program with a baccalaureate degree in accounting can complete the program in less than two years.

The Master of Information Systems Management (MISM) Program offers a specialization in information systems and the application of information technology in business organizations based on a general background in business and accounting. The

MISM degree is awarded at the completion of the professional program, which can begin as early as the junior year of the bachelor of management program and culminates in the Marriott School after the fifth year of study. Students who enter the School of Accountancy and Information Systems with a baccalaureate degree in information systems can complete the program in two years.

The objective of both programs is to develop graduates who exhibit professionalism and are qualified with specialized knowledge in one or more accounting or information system areas. The SOAIS seeks to educate individuals who are: (1) imbued with a strong sense of professional commitment, (2) qualified with specialized knowledge in the areas of accounting, information systems, or tax, (3) committed to continued professionalism—beyond formal education, and (4) capable of becoming leaders who exhibit high standards of ethical conduct within their chosen profession.

Two emphases are offered within the Master of Accountancy Program: Professional Accountancy—MAcc and Tax—MAcc.

The MISM is a distinct degree separate from the MAcc degree. In addition, the SOAIS offers a joint program whereby qualified students may obtain both the MAcc and the JD degree during a specified period of time by meeting certain requirements. Inquiries regarding these programs should be directed to the School of Accountancy and Information Systems, 560 TNRB.

The SOAIS admits an average of 180 students per year into its graduate programs.

Professional Accountancy, Tax—MAcc

The Professional Accountancy emphasis is designed for students who wish to gain a broad base of graduate accounting training. Students typically seek accounting positions in auditing, management, not-for-profit, or PhD programs.

Tax emphasis graduates usually begin careers in the tax area of public accounting firms.

Information Systems Management—MISM

The Master of Information Systems Management Program is designed for students who want professional careers in information systems. Students seek employment with consulting firms, industrial organizations, and not-for-profit entities performing a variety of services dealing with understanding the information needs of an organization, designing, developing, and implementing information systems to meet specified requirements, administering the information systems function, and formulating an information systems master plan to effectively utilize information technology throughout an organization.

Admission and Entry.

- Semesters of entry and application deadlines: fall, March 1 (U.S. and international).
- Application requirements: complete GSM application.
- Entrance examination: GMAT.
- Prerequisite: minimum 3.0 GPA; premanagement core courses Econ 110, Acc 200, Math 119, Stat 221; preaccounting core courses Acc 210, 241, ISys 201, business writing; Acc 453.

Requirements for the MAcc Degree.

- First-year courses (for students seeking BS and MAcc concurrently): SOAIS core comprising Acc 401, 402, 403, 404. Students who have received a BS degree in an area other than accounting must complete intermediate accounting 1, intermediate accounting 2, accounting systems, cost/managerial accounting, auditing, introduction to taxation, and business law at a college/university in the United States prior to applying for the MAcc degree.
- Common requirements: graduate MSM core comprising finance, management, operations, organizational behavior, management communication, management seminar, personal development, MBA 581, 682, MCom 642.
- Emphases:
Professional Accountancy: MBA 620–629; ISys 580, Acc 522, 610, 630, 631, 640, 641, 650. Elective group: 9 hours, of which at least 6 must be nonaccounting, from any MSM course *not* selected above or other courses approved by program coordinator. Acc 343 counts as a nonaccounting course.
Tax: ISys 580, Acc 523, 603, 620, 621, 622, 623, 624. Elective group A: 3 hours from Acc 625R, 626, 628. Elective group B: 6 hours, of which at least 3 must be nonaccounting, from any MSM course *not* selected above or other courses approved by program coordinator. Acc 343 counts as a nonaccounting course. Tax classes are not acceptable for group B.

Requirements for the MISM Degree.

- First-year courses (for students seeking a BS Management/Information Systems Emphasis and MISM concurrently): Acc 510, 511; ISys 440, 443, 445, 546, 548.
- Common requirements: graduate MSM core comprising finance, management, operations, organizational behavior, management communication, management seminar, personal development, MBA 581, 682, MCom 642.

- MISM requirements: Acc 657; ISys 540, 644, 647, 649, 691R. Elective group A: 6 hours from ISys 590R, 599R, 648, 656. Elective group B: 9 hours from any MSM courses *not* already selected above or from other courses as approved by program coordinator.

FINANCIAL ASSISTANCE

The School of Accountancy and Information Systems utilizes the Marriott School's financial aid provisions. Qualified students can receive aid from the following: the Marriott School Scholarship Fund, private scholarship donations, assistantship awards, and loan assistance.

Scholarships. The Marriott School currently has over sixty-five private scholarships. Information and applications are available for second-year students in 730 TNRB (deadline: March 31). In addition, limited scholarship funds are available through the SOAIS.

Assistantships: Research and teaching assistantships are available for qualified second-year students.

Loans. Several loans are available for Marriott School students:

- Marriott School Loans: available to full-time Marriott School day students. Marriott School loans are handled on an individual basis, dependent on financial need and standing within the participating program.
- BYU Short-Term Loans: available for up to the cost of tuition only.
- Federal Stafford Loans: subsidized by the U.S. government. Not available for international students.

More information on and applications for these loans are available from the BYU Financial Aid Office, A-41 ASB, (801) 378-4104.

RESOURCES AND OPPORTUNITIES

The N. Eldon Tanner Building. The Tanner Building, which houses the Marriott School, is one of the finest facilities of its kind. Surrounding the

dramatic eight-story atrium at its center are lecture and seminar rooms, study rooms, a computer laboratory, and a working library.

The Marriott School. The Marriott School is recognized as one of the outstanding management schools in the nation. Faculty are actively engaged in research and publication, and they fill leadership positions in a number of national professional organizations. The school has developed innovative educational programs that include internships, executive visitation programs, special student consulting and research projects, and other activities designed to bring management education and training closer to management practice. This is accomplished, in part, through the Marriott School's National Advisory Council, and the Executives on Campus Program.

National Advisory Council.

Consisting of sixty-five to seventy prominent business and government executives, the National Advisory Council lends major support to the Marriott School. Students benefit by interacting with council members in special campus lectures and seminars and by visiting or working with these executives in their respective organizations. Furthermore, the council assists students with placement opportunities, helps develop funding sources for scholarships, and provides professional development for faculty members.

The Executives on Campus

Program. This program gives students an opportunity to interact with distinguished business and government leaders who come to campus. These executives visit classes and meet with student organizations as well as participate in the Executive Lecture Series and Entrepreneurship Lecture Series.

COURSE DESCRIPTIONS

Accounting**507. Accounting for Nonprofit Organizations. (3)**

Accounting concepts and methods peculiar to governmental units, universities, hospitals, and other nonprofit organizations.

510. Accounting/Information Systems Core 1. (3)

Prerequisite: admission to MSM; Acc 210 or equivalent; ISys 301 or equivalent.

Integrated intermediate accounting for business management students to provide a background in auditing, financial and managerial accounting, and taxation.

511. Accounting/Information Systems Core 2. (3)

Prerequisite: Acc 510.

Continuation of Acc 510.

522. Advanced Taxation. (3)

Tax laws as they apply to selected tax entities, with an introduction to tax research methodology.

523. Tax Research Methodology. (3)

In-depth treatment of research and procedures emphasizing communication and presentation of findings.

593R. Selected Topics in Accounting. (1-3)

Prerequisite: admission to Marriott School.

Subjects to be determined by department/instructor.

599R. Academic Internship: Accounting. (1-3)

On-the-job experience and training in industry, government, or public accounting firms.

603. Advanced Financial Accounting. (3)

Prerequisite: MSM core.

Advanced financial accounting topics including pensions, earnings per share, accounting changes, and deferred income taxes.

610. Accounting Research Seminar. (3)

Prerequisite: admittance to MAcc.

Professional standards and professional literature of accounting and auditing; related academic research. Research tools, information technologies, and critical analysis emphasized.

618. Personal Financial Planning. (1.5)

Personal financial planning issues from a CPA's perspective.

620. Special Problems in Federal Taxation. (3)

Special property transactions, accounting periods and methods, tax payments and credit, tax concepts, and reporting tax liability.

621. Corporate Taxation 1. (3)

Federal income taxation of corporations and shareholders.

622. Corporate Taxation 2. (3)

Continuation of Corporate Taxation 1. Includes consolidated returns.

623. Taxation of Partnerships. (3)

Federal income taxation of general and limited partnerships and partners.

624. Taxation of Estates, Gifts, and Fiduciaries. (3)

Federal taxation of property transferred by death and gift; federal taxation of income of trusts and estates.

625R. Current Tax Policy. (3)

Intensive study of special and current tax topics and policies.

626. Taxation of Deferred Compensation and Fringe Benefits. (3)

Federal legislation and regulations treating pensions, profit-sharing plans, and other types of deferred compensation; fringe-benefit problems.

628. Taxation of Foreign Income. (3)

Federal taxation of foreign transactions.

630. Advanced Audit 1. (3)

Prerequisite: Acc 610.

Auditing methodology, professional auditing standards, and current issues.

631. Assurance Services. (1.5)

Prerequisite: Acc 630 or preapproved internship.

Information needed for contemporary business decisions. Skills needed to provide value-added activities such as analyzing, interpreting, measuring, and evaluating information.

635. Fraud Audit. (1.5)

Fraud prevention, detection, investigation, issues, and methodology.

636. Advanced Audit 2. (1.5)

Prerequisite: Acc 630.

Selected advanced internal and external audit topics.

640. Advanced Professional Financial Accounting. (3)

Prerequisite: MSM core.

Advanced financial accounting topics including pensions, earnings per share, accounting changes, and deferred income taxes.

641. Financial Statement Analysis. (1.5)

Prerequisite: Acc 640.

Analysis of financial statements and the accompanying footnotes. How various accounting methods might affect interpretation and use of financial information.

645. International Accounting and Multinational Enterprises. (1.5)

Accounting from an international perspective: flow of information in multiple currencies, complying with reporting requirements, setting budgets and monitoring performance, and controlling corporate assets through reports and audits.

646. Consolidated Financial Statements. (1.5)

Prerequisite: Acc 640.

Consolidated financial statements and related topics.

650. Advanced Managerial Accounting 1. (3)

Prerequisite: MSM core.

Specialized areas in cost determination and cost allocation.

656. Advanced Managerial Accounting 2. (1.5)

Prerequisite: Acc 650.

Advanced managerial accounting and performance measurement issues.

657. Management Consulting and Projects. (3)

Projects-oriented course where students get hands-on experience performing consulting jobs for businesses in Utah. Class includes both in-class instruction and business experience.

692R. Advanced Topics in Accounting. (1-3)

Subject matter varies with needs of students and with instructor. May be repeated for additional credit if subject matter is different.

693R. Readings and Conference. (1-3)

Prerequisite: SOAIS director's consent.

In-depth study one-on-one with chosen professor on topic of mutual interest not currently covered in existing courses.

Information Systems

540. Advanced Business Programming. (3)

Prerequisite: ISys 440 or equivalent programming experience.

Business-oriented introduction to object-oriented (OO) programming including classes, inheritance, polymorphism, report generation, and file processing using current OO languages.

546. Fourth-Generation Programming Languages. (3)

Prerequisite: ISys 440 or equivalent.

Structured Query Language (SQL), application building (menus, forms, reports), and utilizing tools and program languages of database management systems in a client/server environment.

548. Data Communications. (3)

Prerequisite: ISys 201 or equivalent.

Principles of data communications, local and wide-area networks, hardware, software, media standards, management, and business applications.

580. Information Systems Tools and Applications. (3)

Prerequisite: ISys 201 or equivalent.

Applying information systems tools to business situations. Tools covered are updated with changes in the industry.

590R. Seminar in Information Systems. (1-3)

Special topics by announcement.

599R. Information Systems Internship. (1-3)

Approved on-the-job experience. Applying classroom theory and technology to actual problems; exploring career opportunities; learning role of information systems in business environment.

643. Advanced Information Systems Analysis. (3)

Prerequisite: admission to MSM graduate program.

Systems Development Life Cycle (SDLC), emphasizing tools and methods of analysis and general design phases, including investigation, study, definition, and systems specification/selection.

644. Advanced Information Systems Design. (3)

Prerequisite: ISys 443, 445, or equivalents; 540; 546 or concurrent registration.

Concepts and techniques of systems design, emphasizing systems development, systems development tools, and related topics.

645. Advanced Database Analysis and Design. (3)

Prerequisite: admission to an MSM graduate program.

Concepts and techniques of database system development, focusing on conceptual modeling and methods for implementing conceptual models in business organizations.

647. Information Systems Management. (3)

Prerequisite: MSM core.

Information systems strategies, management of information systems function, project management and control, and forecasting future information systems trends.

648. Advanced Data Communications. (3)

Prerequisite: ISys 548.

Design, management, and strategic use of local area networks (LANs), wide area networks (WANs), intranets, and the Internet to solve business problems.

649. Reengineering and Information Technology. (3)

Prerequisite: MSM core.

Identifying, modeling, analyzing, and reengineering business processes and effectively employing information technology throughout the organization.

656. Operating Systems. (3)

Prerequisite: admission to MSM graduate program.

Principles of operating systems; their selection and use in business organizations.

691R. Research Seminar. (3)

Prerequisite: admission to MISM program.

Research methods and their application to information systems problems.

FACULTY

ALBRECHT, W. STEVE, *Professor*. PhD, University of Wisconsin, 1975. Financial; Audit.

BOYER, GLEN L., *Associate Professor*. PhD, University of North Dakota, 1972. Information Systems.

CHERRINGTON, J. OWEN, *Professor*. PhD, University of Minnesota, Minneapolis, 1972. Financial; Managerial; Systems.

COTTRELL, DAVID M., *Assistant Professor*. PhD, Ohio State University, 1992. Managerial; Audit; Financial.

DALEBOUT, RICHARD S., *Associate Professor*. JD, University of Utah, 1971. Business Law.

DENNA, ERIC L., *Associate Professor*. PhD, Michigan State University, 1989. Information Systems.

GARDNER, ROBERT L., *Professor*. PhD, University of Texas, Austin, 1979. Tax.

GLOVER, STEVEN M., *Assistant Professor*. PhD, University of Washington, 1994. Audit; Financial; Managerial.

HANSEN, GARY W., *Associate Professor*. PhD, Indiana University, 1974. Information Systems.

HANSEN, JAMES V., *Professor*. PhD, University of Washington, 1973. Information Systems.

HARDY, JOHN W., *Professor*. PhD, University of Texas, Austin, 1972. Managerial.

HOWE, KEITH R., *Associate Professor*. DBA, Arizona State University, 1979. Managerial; Audit.

JACKSON, ROBERT B., *Assistant Professor*. PhD, Brigham Young University, 1994. Information Systems.

JOHNS, SHARON K., *Assistant Professor*. PhD, Texas A&M University, 1997. Financial.

LIDDLE, STEPHEN W., *Assistant Professor*. PhD, Brigham Young University, 1995. Information Systems.

LIVINGSTONE, DONALD H., *Lecturer*. BS, Brigham Young University, 1966; CPA, 1970. Audit; Mergers and Acquisitions; Banking.

McKELL, LYNN J., *Professor*. PhD, Purdue University, 1973. Information Systems.

MESERVY, RAYMAN D., *Associate Professor*. PhD, University of Minnesota, 1985. Audit; Information Systems.

NEMROW, NORMAN R., *Lecturer*. MAcc, Brigham Young University, 1979; CPA, 1981. Financial.

PALMER, GLEN O., *Assistant Professor*. MAcc, Brigham Young University, 1963. Tax.

PETERSON, FREDRIC G., *Assistant Professor*. PhD, University of Utah, 1973. Quantitative Methods; Managerial.

PRAWITT, DOUGLAS E., *Assistant Professor*. PhD, University of Arizona, 1993. Audit; Managerial.

QUASS, DALLAN W., *Assistant Professor*. PhD, Stanford University, 1997. Information Systems.

RADEBAUGH, LEE H., *Professor*. DBA, Indiana University, Bloomington, 1973. International Business.

RANDALL, BOYD C., *Professor*. PhD, University of Minnesota, 1972. Tax.

ROMNEY, MARSHALL B., *Professor*. PhD, University of Texas, Austin, 1977. Audit; Information Systems.

SKOUSEN, K. FRED, *Professor*. PhD, University of Illinois, 1968. Financial.

SPIPKER, BRIAN C., *Assistant Professor*. PhD, University of Texas, Austin, 1993. Tax.

STEWART, DAVE N., *Professor*. PhD, University of Florida, 1980. Tax.

STICE, EARL K., *Professor*. PhD, Cornell University, 1988. Financial.

STICE, JAMES D., *Associate Professor*. PhD, University of Washington, 1989. Financial.

STOCKS, KEVIN D., *Professor*. PhD, Oklahoma State University, 1981. Managerial; Information Systems.

STREULING, G. FRED, *Professor*. PhD, University of Iowa, 1971. Tax.

SWAIN, MONTE R., *Associate Professor*. PhD, Michigan State University, 1991. Managerial.

WOODFIELD, LEON W., *Professor*. DBA, Michigan State University, 1965. Financial.

WORSHAM, RONALD G., *Assistant Professor*. PhD, University of Florida, 1994. Tax.

AGRONOMY AND HORTICULTURE

Chair: Von D. Jolley
Graduate Coordinator: Phil Allen

275 WIDB
Provo, UT 84602-5183
(801) 378-2491

THE PROGRAM OF STUDIES

Agronomy and Horticulture are two fundamental sciences concerned with feeding, clothing and beautifying the world. They are among the primary sciences associated with genetic engineering to improve the quality of life for humanity. The academic thrust of the department is to ground students firmly in the science of these two disciplines to qualify them for further graduate work or for employment in industry, government, or private enterprise.

The Department of Agronomy and Horticulture offers two degrees: Agronomy—MS and Horticulture—MS. The department also offers Molecular Biology—MS as an interdepartmental program.

Areas of specialization within the degrees: Crop Science, Soil Science, Horticulture, Developmental Agriculture.

There will usually be an average of eight graduate students pursuing the MS degree. The program is intended to be completed in two calendar years.

Agronomy, Horticulture—MS

Agronomy: Agronomy is the science that feeds the world. It is a composite title for issues associated with the major food crops, soils, environmental restoration, reclamation, genetic engineering, Third-World development, etc.

Horticulture: Horticulture is the science of fruit and vegetable production. These food products are finding greater essential use in our diet as scientific knowledge about human needs is defined. Horticulture also

finds expression in the beauty of growing plants and in the floral art form.

Admission and Entry.

- Semesters or terms of entry and application deadlines: fall, spring, and summer: February 1; winter: June 30 (U.S. and international).
- Entrance examination: GRE general test.
- Prerequisite:
Agronomy or Horticulture (MS): baccalaureate degree in agronomy or horticulture or related field.

Requirements for Degree.

- Credit hours:
Thesis Option (30 hours): minimum 24 course work hours plus 6 thesis hours (AgHrt 699R).
Project Option (36 hours): minimum 30 course work hours plus 6 project hours (AgHrt 698R).
- Thesis: completion of the thesis in scientific journal format (preferred) or in standard university format.
- Project: completion of a scholarly project report.
- Undergraduate hours: no more than 9 semester hours may be applied toward master's degree.
- Examinations: (A) final oral examination; (B) defense of thesis or project.
- Minor: not required; students desiring a minor may choose from botany, chemistry, computer science, food science, geology, geography, mathematics, microbiology, physics, statistics, range science, or zoology.

Molecular Biology Program—MS or PhD

Graduate degrees in molecular biology at Brigham Young University are coordinated by the Molecular Biology Program in the College of Biology and Agriculture. This degree prepares students in the philosophy, procedures, and tools used to perform biological research at the molecular level. Specializations are available from molecular biology faculty in the Agronomy and Horticulture Department.

Admission and Entry.

Students should apply to the Molecular Biology Program in the college and designate their preferred area of specialization as Agronomy or Horticulture. See Admission and Entry in the Molecular Biology section of this catalog.

Requirements for Degree.

See Requirements for Degree in the Molecular Biology section of this catalog.

FINANCIAL ASSISTANCE

Financial assistance is available for these programs through the Department of Agronomy and Horticulture. The department has from four to seven assistantships. There are also funds for tuition off-sets granted through the department from the Office of Graduate Studies. Other financial aid is available through the university.

RESOURCES AND OPPORTUNITIES

Agriculture Station. The station encompasses several sites, all of which support research in basic and applied agriculture. Station facilities include: an 837-acre farm in Spanish Fork, Utah, a few miles south of Provo, with 80 acres of orchards, crop research plots, a 440-cow dairy, a 60-head beef herd, and a 70-sow swine unit; the 9,388-acre BYU Skaggs Research Ranch near Malta, Idaho; and several livestock project areas in north Provo, among them the Ellsworth Meat and Livestock Center and poultry, sheep, and horse projects. At these facilities research can be conducted on soils and on field, forage, and horticultural crops.

Ezra Taft Benson Agriculture and Food Institute. The major objective of the institute is to raise the quality of life among the people of the world through improved nutrition and enlightened agricultural practices. Emphasis is placed on teaching and training students who wish to work in foreign countries and on training people from those countries in agri-

culture and food science practices that can be used to improve life. Research to improve agricultural practices, family nutrition, and appropriate technology is encouraged.

M. L. Bean Life Science Museum. Exhibits and collections of biological specimens are housed in the M. L. Bean Life Science Museum. The exhibits include habitat studies of local as well as exotic plant and animal species and a large and valuable collection of trophies from North America, Africa, and Asia.

USDA Forest Service Shrub Science Laboratory. Housed on the BYU campus, this laboratory supports one of the finest research programs on native shrubs in the world. Here eleven PhD research scientists with adjunct faculty appointments work with BYU faculty members and graduate students. Laboratories, greenhouses, and gardens on campus and around the state support studies on desert shrubs.

Other Laboratory and Field Resources. On the Provo campus are an arboretum, a small animal vivarium, a tissue culture room, and several environmental chambers. Laboratory facilities include gas chromatographs-mass spectrometers, isotope ratio mass spectrometers, transmission and scanning electron microscopes, ultra centrifuges, visible ultraviolet and infrared spectrophotometers, gas chromatographs, high-performance liquid chromatographs, infrared gas analyzers, atomic absorption spectrophotometer, inductively coupled plasma spectrophotometer, ion chromatograph, near infrared spectrophotometer, and many other items. Besides excellent greenhouse facilities and environmental chambers, the department has an experimental research area at the BYU Agriculture Station and a horticulture study area where all-American vegetable and flower selections are grown.

Faculty and graduate students are currently engaged in a number of significant and interesting research

projects, funded both internally and externally. Some of these are: mineral uptake by plants; ecology and seed physiology; photosynthetic rate and water-use efficiency in plants; plant breeding and molecular genetics; forage research; and environmental science.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

501R. (AgHrt-AnSc-FSN) Village Agriculture and Nutrition in Latin America (1)

Prerequisite: experience in Latin America and/or in issues relative to the seminar.

Problems, successes, failures, and challenges facing those who work in agricultural research, training, and development related to small-scale farmers.

511. Soil Physics. (3)

Prerequisite: AgHrt 282, Chem 105; Math 112 or 119; or equivalent. Recommended: Phscs 105 or 121; or equivalent.

Physical relationships of water, heat, and gases in soils; physical and chemical properties of clays. Mathematical modeling of physical properties and transport processes.

514. Soil Microbiology. (3)

Prerequisite: Chem 106, 107, or equivalent.

Ecology and role of soil microorganisms in nutrient cycling, decomposition of organic matter and waste materials, and degradation of agricultural chemicals in soil.

520. Saline and Sodic Soils. (3)

Prerequisite: AgHrt 305, Chem 105, 106, 107, or equivalent.

Physical and chemical properties of saline and sodic soils and irrigation waters—their diagnosis, reclamation, and management for sustainable crop production.

540. Crop Physiology. (3)

Prerequisite: Botny 440; or equivalent.

Plant-soil-climate relationships; crop management practices related to physiological processes in plants.

550. Developmental Plant Physiology (3)

Prerequisite: Botny 440 or equivalent.

Developmental phenomena in higher plants, emphasizing seed physiology, plant growth regulation, and plant stress responses.

559. (AgHrt-Botny) Advanced Plant Breeding and Biotechnology. (3)

Prerequisite: Botny 341; AgHrt-Botny 459; or equivalent. Recommended: AgHrt-Botny 485 or equivalent.

Genetics and methods of plant breeding and biotechnology related to improving agronomic and horticultural crops.

560. Soil and Plant Analysis. (3)

Prerequisite: AgHrt 282 or equivalent.

Laboratory chemical analysis of soils and plant materials in soil and plant research.

573. (AgHrt-Botny) Plant Cytogenetics. (3)

Prerequisite: Botny 341, 342, 343; AgHrt-Botny 559; or equivalent.

Plant chromosome morphology and structure, polyploidy, aneuploidy, replication and endoreduplication, classical and molecular cytogenetic analytical methods, chromosome evolution, and chromosome engineering.

595. Agricultural Experimentation: Design and Analysis. (2)

Prerequisite: Stat 222 or 510; or equivalent.

Planning, experimental design, and techniques of analysis in agriculture.

598R. Advanced Topics in Agronomy and Horticulture. (1-3)

605. Soil-Plant Relationships. (3)

Prerequisite: AgHrt 282, 305; Botny 440; organic or biochemistry course.

Soil-plant nutrition including mechanisms of nutrient uptake, transfer, and assimilation; mechanisms of nutrient immobilization and toxicity in soils and plants.

694R. Seminar. (1)

697R. Research. (1-9)

698R. Master's Project. (1-6)

For project option only.

699R. Master's Thesis. (1-9)

FACULTY

ALLEN, PHIL S., *Associate Professor.*

PhD, University of Minnesota, 1990. Seed Physiology; Ornamental Horticulture; Seed Physiology.

HORROCKS, R. DWAIN, *Professor.* PhD, Pennsylvania State University, 1967. Crop Physiology; Ecological Modeling; Forage Production and Utilization.

JEFFERY, LARRY S., *Professor.* PhD, North Dakota State University, 1966. Physiology of Weed Growth and Competition.

JELLEN, ERIC N., *Assistant Professor.* PhD, University of Minnesota, 1992. Classical and Molecular Cytogenetics; Genetic Mapping; Plant Breeding.

JOLLEY, VON D., *Professor.* PhD, Iowa State University of Science and Technology, 1976. Mineral Nutrition in Plants; Chemistry of Iron Uptake in Plants.

NELSON, SHELDON D., *Professor.* PhD, University of California, 1971. Soil Physics; Irrigation Management; Environmental Water Quality.

STEVENS, MIKEL R., *Assistant Professor.* PhD, University of Arkansas, 1993. Plant Breeding; Molecular Genetics.

TERRY, RICHARD E., *Professor.* PhD, Purdue University, 1976. Soil Microbiology; Reclamation and Restoration of Environmentally Disturbed Sites.

WILLIAMS, C. FRANK, *Professor.* PhD, Oregon State University, 1971. Plant Propagation; Turf Management; Organic Materials Recycling; Water Quality.

ANIMAL SCIENCE

Chair: Richard N. Thwaites
Graduate Coordinator: Richard O. Kellems

353 WIDB
 Provo, UT 84602-5182
 (801) 378-4220

THE PROGRAM OF STUDIES

The Animal Science Graduate Program is designed to train students in the following areas: breeding and genetics, meat and muscle biology, molecular biology, reproduction, monogastric and ruminant nutrition, management, and international production.

The master of science (MS) degree in animal science is designed to prepare a student to pursue a PhD degree or provide the student with additional technical skills beyond the BS degree to be successful as a livestock operation manager or as a scientist involved with technical support or international livestock production.

The Animal Science Department offers one degree: Animal Science—MS. The department also offers Molecular Biology—MS as an interdepartmental program.

Areas of specialization within the animal science degree: Genetics, Nutrition, Reproduction, Management, Meats, Animal Health.

Animal Science—MS

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, spring, February 1 (U.S. and international).
- Entrance examinations: GRE general test and the general animal science exam.
- Prerequisite: baccalaureate degree in animal science or in a closely related field.

Requirements for Degree

- Credit hours:
Thesis Option (30 hours): minimum 24 course work hours plus 6 thesis hours (AnSc 699R).
Project Option (36 hours): minimum 30 course work hours plus 6 project hours (AnSc 698R).
- Thesis (required for thesis option): completion of the thesis in standard university format or in scientific journal format.
- Project (required for project option): completion of a scholarly project report.
- Required courses:
 AnSc 507, 510 or 574, 692R (each semester of residence); Stat 510, 511; plus additional elective courses as required by the student's graduate committee.
- Examinations: (A) written and oral examination on course work; (B) oral defense of thesis.
- Minor (optional): agronomy, horticulture, botany, chemistry, computer science, food science and nutrition, microbiology, statistics, or zoology (emphases in agribusiness and animal science are available).

Molecular Biology Program—MS or PhD

Graduate degrees in molecular biology at Brigham Young University are coordinated by the Molecular Biology Program in the College of Biology and Agriculture. This degree prepares students in the philosophy, procedures and tools used to perform biological research at the molecular level. Specializations are available from molecular biology faculty in the Animal Science Department.

Admission and Entry.

Students should apply to the Molecular Biology Program in the college and designate their preferred area of specialization as Animal Science. See Admission and Entry in the Molecular Biology section of this catalog.

Requirements for Degree.

See Requirements for Degree in the Molecular Biology section of this catalog.

FINANCIAL ASSISTANCE

Teaching and research assistantships are offered on a competitive basis by the department.

RESOURCES AND OPPORTUNITIES

Agriculture Station. The station encompasses several sites, all of which support research in basic and applied agriculture. Station facilities in Spanish Fork include a 793-acre farm, a 425-cow dairy, a 60-head beef herd, and a 70-sow swine unit. The 9,228-acre BYU Skaggs Research Ranch is located in Malta, Idaho, and consists of a cropping operation, beef cow operation, and feedlot. Campus livestock facilities consist of the Ellsworth Meat Laboratory and horse, poultry, and sheep units.

Ellsworth Meats Laboratory.

Equipped for performing chemical, microbiological, and meat tenderness analyses, the laboratory researches aspects of meat emulsions and cured meat quality, among other things.

Molecular Laboratory. Protein and DNA isolation, separation, and characterization facilities for vaccine development and working with pathogenic organisms at the class 2 level are available, as is equipment for the production of transgenic embryos.

Nutrition Facilities. Facilities are available for conducting metabolism trials (sheep, poultry, rabbits) as well as a well-equipped nutrition laboratory for evaluating feed and biological samples.

Reproduction Laboratories.

Laboratories are located on campus and at the BYU Agriculture Station for conducting basic and applied research. These labs are equipped to handle sample collection and processing, radioisotopes, chemical and biological analyses, small and large animal surgery, embryo manipulation and culturing, and tissue and cell culture. Diagnostic imaging, ultrasound, and surgical facilities are available.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

501R. (AnSc-AgHrt-FSN) Village Agriculture and Nutrition in Latin America. (1)

Prerequisite: experience in Latin America and/or in issues relative to the seminar.

Problems, successes, failures, and challenges facing those who work in agricultural research, training, and development related to small-scale farmers.

507. Advanced Animal Nutrition. (4)

Prerequisite: AnSc 207; Chem 152, 181.

Functions of nutrients in metabolism; methods for assessing nutrient utilization and requirements.

510. Advanced Reproductive Physiology. (4)

Prerequisite: AnSc 310 or equivalent.

Molecular, biochemical, and hormonal regulation of processes controlling reproduction in mammalian species.

520. Case Studies in Animal Production. (3)

Prerequisite: BS in animal science with agribusiness emphasis.

Case studies that require students to solve problems in animal production dealing with nutrition, reproduction, genetics, health, and product processing.

525. Case Studies in International Animal Production. (3)

Prerequisite: BS in animal science with agribusiness emphasis.

Case studies in international animal production on both village and large-scale farms dealing with nutrition, reproduction, genetics, health, and product processing.

530. Management of National Animal Industries. (2)

Prerequisite: BS in animal science with agribusiness emphasis.

Incorporation of accounting, finance, marketing, and human relations principles with animal science principles in solving managerial problems in animal industries.

535. Management of International Animal Industries. (2)

Prerequisite: BS in animal science with agribusiness emphasis.

Incorporation of accounting, finance, marketing, and human relations principles with animal science principles in solving managerial problems in international animal industries.

571. Animal Biotechnology. (2)

Prerequisite: Zool 373 or Botny 342 or Mcbio 441; Chem 481; or equivalents.

Applying molecular biology to animal science. Practical experience in laboratory techniques related to biotechnology.

574. (AnSc-Botny) Introduction to Population Genetics. (3)

Prerequisite: introductory courses in genetics and statistics.

Quantitative study of factors influencing changes in gene frequencies in natural and domestic animal and plant populations.

591R. Selected Topics in Animal Science. (0.5-3)

Prerequisite: instructor's consent.

595R. Special Problems in Animal Science. (0.5-2)

Prerequisite: instructor's consent.

599R. Academic Internship. (2-9)

Prerequisite: department's or cooperative education coordinator's consent.

On-the-job experience in livestock or meat production practices, veterinary medicine, or research. On- or off-campus opportunities.

692R. Seminar. (1)

698R. Master's Project. (1-9)

699R. Master's Thesis. (1-9)

FACULTY

JOHNSTON, N. PAUL, *Professor*. PhD, Oregon State University, 1971.

Nutrition, Poultry and Small Animal; Reproduction and Light Interaction Poultry.

KELLEMS, RICHARD O., *Professor*. PhD, Oregon State University, 1976. Ruminant Nutrition; Alternative Feedstuff Development and Evaluation; Nutrient Utilization.

KNOWLES, JOHN E., *Assistant Professor*. DVM, Colorado State University, 1991. Animal Health; Reproductive Physiology and Equine Medicine.

KOORYMAN, DAVID L., *Assistant Professor*. PhD, Ohio University, 1993. Animal Biotechnology; Molecular Genetics.

ROBINSON, TODD F., *Assistant Professor*. PhD, Cornell University, 1998. Cell Growth; Biology Metabolic Processes.

ROEDER, BEVERLY L., *Professor*. DVM, Ohio State University, 1982; PhD, Pennsylvania State University, 1990. Anatomy; Physiology; Medicine and Surgery; Animal Health; Prevention and Diagnoses of Metabolic Disorders.

SILCOX, ROY W., *Assistant Professor*. PhD, North Carolina State University, 1986. Reproductive Physiology; Management; Regulation of Ovulation; Superovulation; Embryonic Development.

THWAITES, RICHARD N., *Professor*. DVM, Colorado State University, 1981; PhD, University of Georgia, 1991. Veterinary Technology; Pathogenicity.

ANTHROPOLOGY

Chair: Joel C. Janetski

Graduate Coordinator: David J. Johnson

945 SWKT
Provo, UT 84602-5522
(801) 378-6111

THE PROGRAM OF STUDIES

The graduate program in anthropology emphasizes archaeology. Focusing on the emergence of complex societies, simple farmers and hunter-gatherers, and historic archaeology, the program's strength is the diversity of research opportunities it affords students, especially in Mesoamerica and the Great Basin/Southwest regions of North America.

Annual field schools in historic and prehistoric archaeology provide training in resolving field problems. The department's geographical specialties in archaeology are the Intermountain West (which verges into the southwestern cultural area in southern Utah), Mexico, Guatemala, and the Middle East. The university conducts field research in each of those areas, and qualified students may participate. Also, historic site excavations in Utah, Illinois, and New York have given students experience at mining, military, village, and LDS Church history sites.

Rather than emphasize specialized or topical interests, however, the program equips the graduate with the basics of professional anthropology: a broad and versatile perspective and the ability to (1) define a research problem, (2) choose tools wisely for approaching it, (3) gather and analyze data efficiently and creatively, and then (4) communicate results and recommendations effectively.

One degree is offered through the Department of Anthropology: Anthropology—MA. An anthropology minor is also available to students enrolled in other graduate programs.

From four to six students enter the program each year, and most take three years to complete the requirements. The number of students in the program varies between ten and fifteen.

Anthropology—MA

The aim of this program is to prepare students (1) for productive employment at a junior professional level upon receiving an MA degree or (2) for entry into PhD programs in anthropology elsewhere.

Only a broad discussion of requirements is provided here. The department sends each prospective graduate student the "Graduate Program Description," a detailed, step-by-step outline of expectations, requirements, and guidelines for progress through the program. The student must return a form indicating that he or she has read the detailed guidelines, understands them, and agrees to be governed by them. This is done because requirements sometimes change slightly in the interval between submission of catalog copy and publication of the finished catalog. By writing, calling, or visiting the department, prospective students will receive the most up-to-date and appropriate information.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international); winter, February 1 (U.S. and international).
- Application requirements: submission of a letter of intent that specifies particular areas of interest. This letter will provide the basis for assignment of a temporary faculty advisor, who will work with the applicant until a thesis committee is organized.
- Entrance examination: GRE general test score should be entered on line 11 of part D of the application form. Foreign students who do not have English as a native language must take the TOEFL exam and submit the score (577 minimum) with the application.
- Prerequisite: undergraduate degree in anthropology. If a student's

bachelor's degree is not in anthropology, the student may be admitted provisionally while completing appropriate background course work. Students without previous field experience will be required to take the undergraduate field school sequence of Anthr 454R, 455R, and 456R.

Requirements for Degree.

Thesis Option

- Credit hours (30): minimum 24 hours plus 6 thesis hours (Anthr 699R); minimum 20 hours under direct instruction of professional anthropologists at BYU or in another acceptable department at the university. Thesis, reading, internship, and individual work do not count toward these 20 hours.
- Required core courses: Anthr 505 or 510; 520, 695R, 699R, social science statistics.
- Additional courses: 9 hours from Anthr 530–590R; electives.
- Examinations: (A) written comprehensive examination at or near the end of the first year of study; (B) oral presentation of thesis proposal; (C) oral defense of thesis.
- Thesis.

Mesoamerican Nonthesis Option

- Credit hours (30): minimum 18 hours Mesoamerican graduate courses plus 12 graduate core courses; minimum 20 hours under direct instruction of professional anthropologists at BYU or in another acceptable department at the university.
- Required core courses: Anthr 505 or 510; 520, social science statistics.
- Additional courses: 3 hours from Anthr 505, 510, 515, 550, 551, or 575; 18 hours from Anthr 560, 562, 564, 566, 568, 572, 574, 575, or 590R; electives.
- Two publishable quality papers.
- Examinations: written comprehensive examination at or near the end of the first year of study.
- Committee: each student identifies two or more faculty members and obtains their consent to serve on his or her graduate committee. One faculty member will become

chair of the student's graduate committee, and the other will serve on it. The committee and the student agree on a curriculum plan in accordance with the "Graduate Program Description."

Five-Year Integrated BA/MA

- The Department of Anthropology offers an integrated BA/MA that can be accomplished in five years from the start of the BA degree.
- Students who have completed 30 hours of undergraduate anthropology course work, including Anthr 205, 305, and 405, are encouraged to take 500-level courses under either the thesis first-year option or the Mesoamerican emphasis first-year option. Upon completing 9 hours of graduate course work, students may apply to the department for admission to the integrated BA/MA five-year program. They should take the GRE early and satisfy other requirements for admission to graduate study.
- Applying students must subsequently complete their 48-hour undergraduate degree plus the first-year menu (either thesis option or Mesoamerican nonthesis option) of 18 hours of graduate work. (These menus are detailed in the program description booklet available from the department.) If accepted, such students may remain in residence and complete the second-year menu as graduate students. This should take one year.
- The five-year integrated BA/MA allows no "double counting." However, students may apply 500-level graduate work to their 48-hour undergraduate degree, if they elect not to apply for or finish the integrated BA/MA option (provided the graduate courses fulfill the basic intents of the various menu categories of the 48-hour undergraduate degree).
- The department will not consider this option for students with substantial accumulations of undergraduate hours. Students with over 128 hours of undergraduate credit at the time of application will be required to graduate and

seek admission to the graduate program under regular admission procedures.

Anthropology—Minor

A minor in anthropology can add a cross-cultural perspective, useful for people with international or multicultural interests in the following majors or fields of interest: nutrition, education (either elementary or secondary), educational leadership, counseling, international and area studies, psychology, social work, sociology, art, communications, theatre and film, language, business administration, public administration, applied economics, family sciences, marriage and family therapy, geography, or history. The minor requires a minimum 15 hours. See department for specific requirements.

FINANCIAL ASSISTANCE

The Department of Anthropology offers tuition assistance to all incoming graduate students.

Additional support comes through assistantships, grants, and employment offered by the department and the Museum of Peoples and Cultures, but the funds are limited. The goal is to provide some support for many students rather than generously support a few. The department is currently developing special scholarships, work study, and project support programs for Native American students interested in careers in anthropology and museology. This is being done with the assistance of Multicultural Student Services at BYU.

The Office of Public Archaeology in the museum regularly gives employment and experience to students prepared to participate in contract archaeology projects.

RESOURCES AND OPPORTUNITIES

Museum of Peoples and Cultures. Closely associated with the Anthropology Department, the

Museum of Peoples and Cultures offers unique research opportunities for students and faculty, several of whom have research offices in the museum. Located south and west of campus in Allen Hall, the museum holds a number of important archaeological and ethnographic collections that have not been systematically analyzed and reported. These collections, which represent Utah Valley, the American Southwest, and Mesoamerica, as well as other parts of the world, provide material for thesis topics, professional publications, and academic credit. Research entities in the museum include the Archaeological Technical Laboratory, which specializes in botanical and minerals analysis, and the Office of Public Archaeology, one of the most active archaeological contracting organizations in the intermountain area.

The New World Archaeological Foundation. This foundation is a research institution focused on formative Mesoamerican civilizations, especially in Chiapas, Mexico. Established in 1952, the NWAf maintains a staff and research facilities in San Cristobol, Chiapas. The NWAf publishes a monograph series (papers) as well as notes to disseminate research findings. Graduate student opportunities through the foundation include laboratory research on campus and limited field work in Mexico.

Joseph Fielding Smith Institute for Church History. The institute's purpose is to study the Latter-day Saint past. Its personnel are historians whose primary work is writing and publishing for professional and general Church audiences. The institute also seeks to facilitate the research of other Church history scholars by providing limited support for research and publication.

Charles Redd Center for Western Studies. Established in 1972 under an endowment from Charles Redd, a prominent Utah stockman and philanthropist, the center is charged with promoting the study of all aspects of the American West. The center pub-

lishes a monograph series, assists faculty and student research through grants and fellowships, and sponsors lectureships each year.

Jerusalem Center for Near Eastern Studies. On Mount Scopus, overlooking the Holy City, BYU's newly completed Jerusalem Center for Near Eastern Studies provides extraordinary educational opportunities for students and scholars. A seven-tiered, 120,000-square-foot structure, the center houses an extensive learning resource area, classrooms, dormitories, galleries, exhibits, a library, and auditoriums. Scholars and visitors from other universities, as well as students enrolled in its academic programs, are served here. The center's library, for example, offers a selected collection of contemporary Holy Land readings, rare books, special collections, and accessible computer data. For information concerning opportunities for graduate study in Jerusalem, call or write Victor Ludlow, chair of Near Eastern Studies (211 HRCB). BYU Travel Study information can be obtained from the director of the Jerusalem Center.

Examples of current faculty and graduate student research include: socio-political complexity in Chiapas and Guatemala; development of complex society among the Maya; hunter-gatherer ecology in the eastern Great Basin and Syro-Palestine; historic economies and settlements of the western frontier and Utah.

For a more detailed description of the graduate program requirements, send for a copy of the department's Graduate Program Description.

COURSE DESCRIPTIONS

Undergraduate BYU anthropology students may enroll for the following courses if they have completed 30 hours in their major.

505. Anthropological Theory. (3)

Major contributions to the development of anthropological theory, circa 1970 to the present.

510. History of Archaeology. (3)

Historical approach to the development of archaeological knowledge, method, and theory; emphases on North America and individual contribution.

515. Settlement, Trade, and Urbanism: Understanding the Ancient Landscape. (3)

Comparative study of the beginnings of settled life, systems of exchange, and city life. Special attention to theory as applied to evidence from the new and old worlds.

520. Economic Anthropology. (3)

Social context of production, distribution, and consumption in nonindustrial societies; technology; exchange and redistribution of resources. Currency, property rights, capital, recruitment, and rewards of labor.

525. Museum Registration and Collections Management. (3)

Prerequisite: Anthr 349 or equivalent.

Instruction and hands-on projects in managing anthropological collections: object-handling, object-tracking, accessing, deaccessioning, cataloguing, collections databases, loans, conservation environments, museum law, and ethical practices.

526. Museum Curation and Programming. (3)

Prerequisite: Anthr 525.

Research and connoisseurship of anthropological collections, curatorial writing, law, and ethics as regards curatorial concerns. Current thought and literature in museum education.

530. Great Basin Archaeology. (3)

Overview of ethnography, history of research, and prehistory of the southwestern United States and northern Mexico. Current issues also emphasized.

535. Southwest Seminar. (3)

Current issues in archaeological research in the American Southwest.

540. Issues in Historic Archaeology. (3)

In-depth review of issues, trends, and methods of historic archaeology.

550. (Anthr-Ling) Sociolinguistics. (3)

Research and theory in anthropological linguistics and sociolinguistics.

551. (Anthr-Ling) Anthropological Linguistics. (3)

Language in culture and society: development, typology, and description.

560. Comparative Mayan Linguistics. (3)

Grammatical, semantic, lexical, and phonological issues in comparative Mayan. Historical linguistics of the Mayan language family. Special emphasis on languages relevant to understanding classic Mayan language and script.

562. Formative Mesoamerica. (3)

Topics and issues concerning beginnings and development of Mesoamerican civilizations. Mexican and preclassic Mayan antecedents of classic Mayan civilization and culture.

564. Classic Mayan Civilization. (3)

Topics and issues concerning archaeological and cultural aspects of classic Mayan civilization and society.

565. Mayan Ceramic Analysis. (3)

Current approaches to classification and analysis of archaeological ceramics, particularly Maya Lowland potter. Includes laboratory study of actual pottery collections from the Maya area.

566. Mayan Ethnohistory. (3)

Topics and issues of cultural change, colonization, and documentation of change processes in the Mayan region, from the postclassic period and independence from Spain.

568. Modern Mayan Society. (3)

Advanced analysis of cultural process issues among the Maya, from their independence from Spain to the present.

572. Ancient Mayan Writing 1. (3)

Nature and content of Mayan hieroglyphic writing, from AD 100 to 1600. Methods of decipherment, introduction to textual analysis, and application to interpreting Mayan language, art, world view, and society. Explorations of literacy and the Mesoamerican background of Mayan script.

574. Ancient Mayan Writing 2. (3)

Prerequisite: Anthr 372 or 572.

Advanced study of Mayan heiroglyphic writing. Guided workshop with focus on inscriptions, rituals, dynastic history, and linguistic records from major Mayan cities. Emphasis on archaeological setting and preparation of technical commentaries.

575. Writing Systems. (3)

Comparative study of writing around the world, emphasizing ancient scripts. Topics include linguistic concepts; social, political, and economic function of early script; ancient literacy; development and extinction of script.

580. Near East Seminar. (3)

Current issues in Near Eastern archaeological research.

585. Current Issues in African Ethnography. (3)

Prerequisite: Anthr 330 or instructor's consent.

Current anthropological issues: the rise of markets and labor systems; statism and nationalism; change in domestic life; globalization of African culture; tradition amidst change.

590R. Seminar. (2-3)

Special topics in archaeology.

596. Museum Projects. (3)

Prerequisite: instructor's consent.

Students supervised in one or more museum projects, such as producing an exhibition, developing educational materials, and accessing collections.

599. Academic Internship: Federal Agency. (1-6)

Earning credit while employed in federal agency archaeology. Agencies include the BLM and U.S. Forest Service.

655R. Field School Supervision. (2)

694R. Readings. (1-3)

Prerequisite: supervising instructor's consent.

Reading about 1,000 pages per credit hour and providing required products.

695R. Research. (1-6)

Prerequisite: completion of 18 hours of 500-level core curriculum for MA program.

Field research, data acquisition, and data analysis. Must be thesis related.

699R. Master's Thesis. (1-9)

FACULTY

BERGE, DALE L., *Professor.* PhD,

University of Arizona, 1968.

Historical Archaeology.

CLARK, JOHN E., *Associate Professor.*

PhD, University of Michigan,

1994. Archaeology; Political and

Economic Institutions; Cultural

Evolution.

CRANDALL, DAVID P., *Assistant*

Professor. DPhil, Oxford

University, 1993. Social

Anthropology; South Africa;

Kinship, Ritual, and Symbols.

FORSYTH, DONALD W., *Professor.*

PhD, University of Pennsylvania,

1979. Archaeology; Ceramic

Analysis; Ethnohistory.

HAWKINS, JOHN P., *Professor.* PhD,

University of Chicago, 1978.

Social Anthropology; Ethnicity;

Kinship and Family.

HOUSTON, STEVEN D., *Professor.* PhD,

Yale University, 1987.

Archaeology; Mayan Writing

Systems; Complex Societies.

JANETSKI, JOEL C., *Professor.* PhD,

University of Utah, 1983.

Archaeology; Ethnohistory;

Hunter-Gatherer Studies.

JOHNSON, DAVID J., *Associate*

Professor. PhD, University of

Utah, 1987. Archaeology;

Archeometry; Ancient Trade,

Near East.

MATHENY, RAY T., *Professor.* PhD,

University of Oregon, 1968.

Archaeology; Ceramic Typology;

Mesoamerica.

ASIAN AND NEAR EASTERN LANGUAGES

Chair: Dilworth B. Parkinson
Graduate Coordinator: Masakazu Watabe

4060 JKHB
 Provo, UT 84602-6117
 (801) 378-2945

E-mail: bourgerie@byu.edu

THE PROGRAM OF STUDIES

One degree is offered through the Department of Asian and Near Eastern Languages: Language Acquisition (Arabic, Chinese, Japanese, or Korean)—MA. This is a collegewide program. Generally not more than two students per language are admitted each year to the acquisition program. The program is designed so that a student can complete the degree in four semesters if he or she enters with the appropriate background (see below).

Language Acquisition (Arabic, Chinese, Japanese, or Korean)—MA

This program offers professional preparation to students seeking careers in applied linguistics, foreign language education, computer-assisted language learning and instruction, and other related areas.

Students become familiar with current theories of second-language acquisition and develop basic skills in applying that knowledge to teaching, testing, and classroom-oriented research in their language of specialization.

The program is quite flexible, with emphases varying according to students' interests and faculty members' expertise. It is ideally suited to the needs of the following types of students:

- Students who have completed undergraduate majors in foreign languages, applied linguistics, or related fields, and who are contemplating eventual careers in academics.

- Foreign language teachers at the secondary school level who wish to further their professional education and acquire more specialized competency in their fields.
- Students seeking the necessary preparation for advanced research and work in the field of high technology applications to language learning and instruction.

Although the nature of the program is applied, the Department of Asian and Near Eastern Languages offers a broad range of supporting courses in modern and classical culture and literature within the various language groups.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination (general test) and a fifteen-minute interview in the language of specialization addressing applicant's academic goals. The interview may be completed in person, by telephone, or on tape in conversation with a second party.
- Prerequisite: baccalaureate degree and strong background in the language of specialization. A basic linguistics background is helpful.

Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours (699R).
- Required courses: Ling 540, 600, 641, 660, 677.
- Elective courses (12 hours): advanced linguistic study of the language of specialization (3 hours), plus 9 hours as approved by the graduate committee.
- Language requirement: reading and speaking ability (202 level) in language other than English in addition to language of specialization.
- Thesis: 6 hours of 699R in language of specialization.
- Examination: oral defense of thesis.

FINANCIAL ASSISTANCE

Full or partial tuition assistance is available, depending on merit. According to department needs, students may also have opportunities to serve as research or teaching assistants to help finance their studies and to gain practical experience.

RESOURCES AND OPPORTUNITIES

The Department of Asian and Near Eastern Languages utilizes the **Humanities Research Center** for world-class computer-assisted language instruction and translation. Other resources are:

The Foreign Language Student Residence. Students who desire a more intensive language study experience and practical application of the language under the direction of faculty and native residents may apply to live in the Foreign Language Student Residence. All activities in the individual apartments in the residence are conducted in the foreign language. Housing is available for men and women in Japanese, Chinese, Arabic, and Korean languages. Graduate students may participate as students or as senior residents.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

Chinese (Mandarin)

599R. Academic Internship. (9)

Prerequisite: Chin 301.

On-the-job cultural and/or language experience.

670R. Tutorial Internship in Chinese. (1-3)

Individual research in cooperation with graduate faculty member in problems relating to Chinese literature and language. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Chinese. (1-3)

Individual study supervised by graduate faculty member in varying topics of specific interest in Chinese literature and language.

690R. Seminar in Chinese. (1-3)

Group studies supervised by graduate faculty member in varying topics of specific interest in Chinese literature and language.

699R. Master's Thesis. (1-6)

Japanese

599R. Academic Internship. (9)

Prerequisite: Japan 301.

On-the-job cultural and/or language experience.

670R. Tutorial Internship in Japanese. (1-3)

Individual research in cooperation with graduate faculty member in problems relating to Japanese literature and language. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Japanese. (1-3)

Individual study supervised by graduate faculty member in varying topics of specific interest in Japanese literature and language.

690R. Seminar in Japanese. (1-3)

Group studies supervised by graduate faculty member in varying topics of specific interest in Japanese literature and language.

699R. Master's Thesis. (1-6)

Korean

599R. Academic Internship. (9)

Prerequisite: coordinator's consent and departmental approval.

On-the-job cultural and/or language experience. Students must meet departmental requirements and consult coordinator before enrollment. Report required.

670R. Tutorial Internship in Korean. (1-3)

Individual research in cooperation with graduate faculty member in problems relating to Korean literature and language. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Korean. (1-3)

Individual study supervised by graduate faculty member in varying topics of specific interest in Korean literature and language.

690R. Seminar in Korean. (1-3)

Group studies supervised by graduate faculty member in varying topics of specific interest in Korean literature and language.

699R. Master's Thesis. (1-6)

Linguistics

(See Linguistics section of this catalog for courses.)

Near Eastern Languages and Literature

Ancient: Akkadian, Aramaic, Coptic, Egyptian, Syriac, and Ugaritic Courses

511R. Studies in Ancient Near Eastern Languages. (2-4) On dem.
Grammar and reading skills.

521R. Special Topics in Ancient Near Eastern Literature. (2-3) On dem.

Historical and comparative studies of ancient Near Eastern literature.

Arabic

531R. Advanced Topics in Arabic. (3) On dem.

Prerequisite: instructor's consent.

Advanced studies in Arabic language and literature.

670R. Tutorial Internship in Arabic. (1-3) On dem.

Individual research in cooperation with graduate faculty member in problems relating to Arabic literature and language. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in Arabic. (1-3) On dem.

Individual study supervised by graduate faculty member in varying topics of specific interest in Arabic literature and language.

690R. Seminar in Arabic. (1-3) On dem.

Group studies supervised by graduate faculty member in varying topics of specific interest in Arabic literature and language.

699R. Master's Thesis. (1-6) On dem.

Hebrew

531R. Studies in Hebrew. (1-3)

Prerequisite: Heb 331.

FACULTY

BELNAP, R. KIRK, *Associate Professor*. PhD, University of Pennsylvania, 1991. Arabic Language and Linguistics.

BOURGERIE, DANA S., *Associate Professor*. PhD, Ohio State University, 1990. Chinese Linguistics: Dialect Studies and Sociolinguistics.

CHRISTENSEN, MATTHEW B., *Assistant Professor*. PhD, Ohio State University, 1994. Chinese Language and Linguistics; Curriculum Development.

GESSEL, VAN C., *Professor*. PhD, Columbia University, 1979. Japanese Language and Literature.

HONEY, DAVID B., *Professor*. PhD, University of California, Berkeley, 1988. Classical Chinese Language and Literature.

MILLER, J. SCOTT, *Associate Professor*. PhD, Princeton University, 1988. Japanese Language and Literature.

PARKINSON, DILWORTH B., *Professor*. PhD, University of Michigan, 1982. Sociolinguistics; Arabic.

PARRY, DONALD W., *Assistant Professor*. PhD, University of Utah, 1992. Modern and Biblical Hebrew.

PERKINS, GEORGE W., *Assistant Professor*. PhD, Stanford, 1977. Japanese Literature.

PETERSON, DANIEL C., *Associate Professor*. PhD, University of California, Los Angeles, 1990. Medieval Islamic Philosophy; Arabic Language and Literature.

PETERSON, MARK A., *Associate Professor*. PhD, Harvard University, 1987. Korean Language and History.

RICKS, STEPHEN DAVID, *Professor*. PhD, University of California, Berkeley, 1982. Hebrew; Near Eastern Languages, History of Religions.

RUSSELL, ROBERT A., *Associate Professor*. PhD, Harvard University, 1977. Second Language Acquisition; Computer-Assisted Instruction.

WARNICK, J. PAUL, *Assistant Professor*. PhD, Ohio State University, 1996; Japanese Linguistics and Pedagogy.

WATABE, MASAKAZU, *Associate Professor*. PhD, University of Southern California, 1978. Linguistics; Japanese.

WILLIAMS, GARY S., *Associate Professor*. PhD, University of Washington, 1973. Chinese Language and Literature.

AUDIOLOGY AND SPEECH-LANGUAGE PATHOLOGY

Chair: David McPherson
Graduate Coordinator: Ron Channell

136 TLRB
Provo, UT 84602-8605
(801) 378-4318

THE PROGRAM OF STUDIES

The separate but overlapping disciplines represented by the Department of Audiology and Speech-Language Pathology involve the study of the processes and disorders of hearing, speech, and language. The department integrates principles and methods of acoustics, anatomy, psychology, linguistics, medicine, physiology, and rehabilitation to prepare students to more effectively help persons of all ages who have either congenital or acquired impairments to hearing, speaking clearly, participating in conversations, or any of the other skills that allow effective communication.

Graduate programs in the department provide a mixture of academic course work, clinical experience, and research involvement. Students are expected to master knowledge related to treating persons with disorders and to apply this knowledge in clinical activities at BYU and at other professional settings in the community. Strong performances in both course work and clinical activities are required, as is the successful completion and defense of a thesis. Because clinical training requires broad expertise, no clinically relevant topics are excluded from coverage in course work or clinical training; however, student research activities are generally channeled into topical areas in which faculty have focal expertise.

The master's degree programs in audiology and speech-language pathology prepare students to (a) work competently with clients of all ages in all professional settings, (b)

conduct research and communicate findings to peers and cooperating professionals, (c) meet requirements for national certification, state licensure, and school certification, (d) qualify for and excel at doctoral study if desired, and (e) maintain currency in their discipline through ongoing, independent study.

The department offers two degrees: Audiology—MS and Speech-Language Pathology—MS.

About six students per year are admitted into the audiology program, and about twelve students per year are admitted into the speech-language pathology program. Students generally complete their programs in two years.

Audiology—MS

As a discipline, audiology involves such topics as the normal anatomy and physiology of the ear, the neurophysiology of hearing, the diseases and disorders of the ear, psychoacoustics, hearing assessments, middle-ear testing, electrophysiological testing of hearing and balance, the design and prescription of hearing aids, aural habilitation and rehabilitation, and hearing conservation.

Admission and Entry.

- Semesters of entry and application deadlines: spring, summer, fall, February 1 (both U.S. and International students).
- Application requirements: submit GRE general test scores using the institution number R 4019. Because audiology is a clinical profession, both academic and personal qualifications are considered in selecting applicants and in evaluating, retaining, and graduating students.
- Prerequisites: students entering a graduate program with a bachelor's degree outside audiology must complete the equivalent of the undergraduate major before taking graduate classes or beginning thesis research.

Requirements for Degree.

- Credit hours: 44 (plus all classes in the undergraduate major), including 6 hours of thesis credit and 6

hours of clinical practicum spread over several semesters or terms.

- Required courses: all the courses listed under Audiology.
- Minor (in related field): optional and in addition to all required major classes.
- Residence: see university residence requirements. Transfer of graduate courses taken elsewhere is not guaranteed and will be evaluated on a course-by-course basis.
- Thesis.
- Examinations: (a) pass ASHA NTE Praxis exam in audiology with score at or above the 75th percentile nationally; (b) oral defense of thesis.

Speech-Language Pathology—MS

The discipline of speech-language pathology involves the study of the anatomy and physiology of speech production mechanisms, the normal and impaired development of speech abilities, disorders of articulation, voice disorders, stuttering and related disorders of speech rate and rhythm, speech acoustics, speech perception, and swallowing disorders. Speech-language pathology also includes the study of normal and impaired language development and language processing, the assessment of children's language and related social and cognitive abilities, the treatment of language impairments, and the assessment and treatment of aphasia.

Admission and Entry.

- Semesters of entry and application deadlines: spring, summer, fall, February 1 (both U.S. and international students).
- Application requirements: submit GRE general test scores using the institution number R 4019. Because speech-language pathology is a clinical profession, both academic and personal qualifications are considered in selecting applicants and in evaluating, retaining, and graduating students.
- Prerequisites: students entering a graduate program with a bachelor's degree outside speech-language pathology must complete

the equivalent of the undergraduate major to meet certification and licensure requirements.

Requirements for Degree.

- Credit hours: 45 (plus all classes in the undergraduate major), including 6 hours of thesis credit and 6 hours of clinical practicum spread over several semesters or terms.
- Required courses: all the courses listed under Speech-Language Pathology.
- Minor (in related field): optional and in addition to all required major classes.
- Residence: see university residence requirements. Transfer of graduate courses taken elsewhere is not guaranteed and will be evaluated on a course-by-course basis.
- Thesis.
- Examinations: (a) pass ASHA NTE Praxis exam in speech-language pathology with score at or above the 75th percentile nationally; (b) oral defense of thesis.

Note: ASLP 680R (Public School Practicum) requires a \$60 fee in addition to tuition.

Financial Assistance

Most of the money that is available for financial assistance in the Department of Audiology and Speech-Language Pathology will be given to graduate students in the form of graduate assistantships. These assistantships involve assisting faculty in course management or research; awardees are selected by faculty from those applying for assistantships on the basis of suitability for the work needed. Other financial aid is available in the form of supplementary awards such as partial tuition waivers; these awards are made on the basis of academic excellence.

Resources and Opportunities.

The Department of Audiology and Speech-Language Pathology is housed in the John Taylor Building and as such is part of the BYU Comprehensive Clinic. This clinic links audiology and speech-language pathology and clinical psychology,

marriage and family counseling, social work, and LDS Social Services in interdisciplinary cooperation on a variety of clinical cases. The clinic also allows for shared access to audiovisual services, computers and networks, and tests and therapy materials.

The BYU Audiology Clinic is staffed by graduate students under faculty supervision and focuses on the assessment and treatment of hearing disorders of students, faculty, staff, missionaries from the Missionary Training Center (Provo), and the public. It is also involved in monitoring the hearing ability levels of university employees for OSHA compliance and in testing the hearing of central Utah's high-risk babies in collaboration with the Utah State Health Department.

The BYU Speech and Language Clinic is also staffed by graduate students under faculty supervision and focuses on assessing and treating the speech and language disorders of students, faculty, staff, missionaries, and the public.

Research Facilities and Equipment.

Audiology and speech-language pathology use a broad range of tools for clinical diagnosis and therapy. The facilities supporting research and clinical work in audiology include state-of-the-art sound suites, numerous portable and clinical audiometers, 32-channel evoked potential and brain mapping, hearing aid analyzer, transient and distortion product otoacoustic emission analyzers, video otoscopy, digital audio recording and editing instrumentation, real-time audio spectral analysis, programmable hearing aids, assistive listening devices, hearing aid modification workstations, electronystagmography, sound-level meters, and sound-level dosimetry equipment.

The facilities supporting research and clinical work in speech-language pathology include spectrographic, laryngographic, and nasometric analyses of speech and voice production, stroboscopic flexible

fiberoptic digital video laryngoscopy and nasoendoscopy, audiovisual equipment for conversational language sampling and analysis, and computer-assisted language sample analysis.

Course Descriptions

Audiology

500. Research Methods (3)

Prerequisite: Stat 221.

Research methods in audiology and speech-language pathology. Applying statistical techniques; professional literature and writing.

544. Psychoacoustics. (2)

Advanced studies in human psychoacoustics and hearing science.

616. Acoustic Impedance Measures. (2)

Middle-ear measurements and special test applications.

617. Auditory Evoked Potentials. (3)

Theoretical and practical application of electrocochleography, brain stem, middle latency, long latency, and cognitive evoked potentials.

618. Vestibular Evaluation. (2)

Theoretical and practical application of vestibular evaluation.

619. Otoacoustic Emissions. (2)

Theoretical and practical applications of otoacoustic emissions testing.

638. Advanced Hearing Tests and Measures. (3)

Advanced audiometric procedures assessing impaired hearing.

639. Community and Industrial Audiology. (2)

Hearing problems in industry; legal implications.

641. Hearing Aids. (3)

Assessing hearing aid performance; the art of fitting hearing aids.

642. Advanced Hearing Aids. (2)

Prerequisite: ASLP 641.

Advanced study of theory and practice of fitting and evaluating hearing aids.

643. Adult Aural Rehabilitation. (2)

Rehabilitative audiology for hearing-impaired adults.

671. Instrumentation-Calibration. (2)

Calibration of audiological instruments.

673. Pathologies of the Auditory Mechanism. (3)

Prerequisite: ASLP 334, 438; or equivalent.

Hearing disorders of outer, middle, and inner ear and central auditory pathway.

685R. Practicum in Clinical Audiology. (1-8)

Prerequisite: instructor's consent.

690R. Seminar in Audiology. (1-3)

690R. Seminar in Hearing Disorders. (1-3)

693R. Directed Individual Study. (1-3)

Prerequisite: instructor's consent.

699R. Master's Thesis. (1-6)

Speech-Language Pathology

500. Research Methods. (3)

Prerequisite: Stat 221 or equivalent.

Research methods in audiology and speech-language pathology; applying statistical techniques; professional literature and writing.

573. Aphasia. (3)

Perspectives on the neurology, clinical assessment, and rehabilitation of aphasic language disturbances in adults.

574. Communicative Disorders of Individuals with Severe Disabilities. (3)

Assessment and treatment of persons with multiple handicaps, including augmentative communication training.

575. Motor Speech Disorders. (3)

Neuropathology, symptomatology, clinical assessment, and treatment of adult motor speech disorders.

630. Theories of Child Language Acquisition. (3)

Process models in lexical, prosodic, syntactic, and semantic facets of first language learning.

633. Dysphagia Management. (2)

Assessment and treatment of swallowing disorders.

634. Head Trauma Management. (2)

Assessment and treatment of speech and language problems associated with traumatic brain injury.

636. Multicultural Issues in Speech-Language Pathology. (3)

Prerequisite: ASLP 350 or equivalent.

Speech and language assessment and intervention with persons from culturally and linguistically diverse backgrounds. Specific topics include cultural diversity, bilingualism, and use of interpreters/translators.

657. Voice and Resonance Disorders. (3)

Assessment and treatment of disorders of the speaking voice.

658. Fluency Disorders. (2)

Assessment and treatment of fluency disorders, including stuttering.

677. Computer-Assisted Language Assessment. (3)

Prerequisite: ASLP 350 or equivalent.

Evaluation and use of software for clinical analysis of children's and adults' normal or impaired language.

679. Language Impairment in Children. (3)

Impact, assessment, and treatment of language impairment in children. In-depth evaluation, including analysis of conversational behaviors.

680R. Internship in Speech-Language Pathology. (2)

685R. Practicum in Speech-Language Pathology. (1-8)

Prerequisite: instructor's consent.

690R. Seminar. (3)

693R. Directed Individual Study. (1-3)

Prerequisite: instructor's consent.

699R. Master's Thesis. (1-6)

FACULTY

BRINTON, BONNIE, *Professor. PhD*, University of Utah, 1981. Child Language Impairment.

CHANNELL, RON W., *Associate Professor. PhD*, University of Utah, 1983. Child Language Acquisition.

FUJIKI, MARTIN, *Professor. PhD*, University of Utah, 1980. Child Language Impairment.

HANKS, WENDY, *Assistant Professor. PhD*, Wichita State University, 1985. Pediatric and Rehabilitative Audiology.

HARRIS, RICHARD W., *Professor. PhD*, Purdue University, 1978. Hearing Science; Perception.

HILTON, LAURENCE M., *Professor. PhD*, Northwestern University, 1973. Communication Sciences and Disorders.

MCPHERSON, DAVID L., *Professor. PhD*, University of Washington, 1972. Audiology; Hearing Science; Electrophysiology.

BOTANY AND RANGE SCIENCE

Chair: Bruce A. Roundy

Graduate Coordinator: Rex G. Cates

425 WIDB

Provo, UT 84602-5181

(801) 378-4281

THE PROGRAM OF STUDIES

Plants play a crucial role in the maintenance of life on this planet. Graduate students in the Department of Botany and Range Science pursue research in the general areas of plant classification (primarily seed plants, algae, and lichens), genetics (molecular emphasis), physiology, ecology, wildlife biology, biological education, and wildland management. Directed by a faculty of seventeen, graduate programs are focused on the biota of the Intermountain West. Students are expected to become familiar with modern theory, tools, and procedures to understand, manage, and conserve the earth's natural resources.

Because BYU is situated near the interfacing of several major biotic provinces and in a region of complex geology and topography, graduate students are surrounded by great biotic richness and ecological diversity. In addition to ready access to a rich variety of natural environments, graduate research is supported by modern laboratory facilities for molecular, ultrastructure, physiological, and genetic studies; an excellent library; controlled environment growth-chambers; a large and well-curated herbarium; and access to well-equipped field stations in the Great Basin Desert, mixed conifer montane forest, sagebrush-grass steppe, and northern Mojave Desert of southwestern Utah. The Shrub Sciences Laboratory of the Intermountain Research Station, U.S. Forest Service, which is located on campus, also strengthens graduate work in the department.

The Department of Botany and Range Sciences offers six degrees: Biological Science Education—MS, Botany—MS, Range Science—MS, Wildlife and Range Resources—MS, Botany—PhD, and Wildlife and Range Resources—PhD. The department also offers two interdepartmental programs: Molecular Biology—MS and Molecular Biology—PhD.

Areas of specialization within the MS degrees: Biological Science Education, Biotechnology, Botany, Conservation Biology, Genetics, Natural Resource Development, Range Science, Wildlife and Range Resources. PhD specializations: Biotechnology, Botany, Genetics, Wildlife and Range Resources.

An average of about forty graduate students pursue degrees in botany and range science at any one time. The ratio of master to PhD students is usually near four to one. Students in master's degree programs graduate in twelve to twenty-four months. PhD students are expected to graduate within thirty-six months after first enrollment. Students involved in field research are advised to commence graduate programs spring term, since much of the necessary research can be completed prior to commencing formal course work fall semester. Such students must coordinate plans carefully with their graduate committee.

Biological Science Education, Botany, Range Science, Wildlife and Range Resources—MS

The biological sciences education degree is designed to prepare students with advanced skills and knowledge for teaching in high schools and colleges. Students opting for this degree may pursue original research or library synthesis projects and present results in either formal thesis or project format. Students selecting programs in botany, range science, or wildlife and range resources will pursue original research topics and present a formal thesis. Since all research for these

degrees is expected to be of publication quality, theses are usually prepared in a form suitable for immediate submission for review by an appropriate scholarly journal.

Admission and Entry.

- Semesters of entry and application deadlines: fall and spring, February 20 (U.S. and international); winter, September 20 (U.S. and international).
- Entrance examinations: GRE general test, advanced biology subject test, and oral diagnostic examination. Foreign students must submit TOEFL scores.
- Prerequisite: Biological Science Education or Botany Program Applicants: baccalaureate degree in botany or equivalent.

Requirements for Degree.

- Credit hours (30 minimum): 24 approved course work hours plus 6 project (Botny 698R) or 6 thesis hours (Botny 699R or Range 699R).
- Required course: Botny 691R or Range 691R (each semester of residence).
- Thesis or project: standard university thesis format or journal publication format. Project format must satisfy committee requirements.
- Examinations: (A) defense of research design; (B) oral examination on course work.
- Oral defense of thesis or project.

Botany, Wildlife and Range Resources—PhD

Candidates for the PhD may choose research topics in botany, plant genetics, aspects of plant physiology, secondary plant product-herbivore interactions, or biotechnology problems. Those seeking the PhD in wildlife and range resources may select research topics in plant or wildlife ecology, ecological physiology, restoration ecology in semiarid environments, or plant systematics. All programs emphasize application of theory to practical problems.

Admission and Entry.

- Semesters of entry and application deadlines: fall and spring,

February 20 (U.S. and international); winter, September 20 (U.S. and international)

- Entrance examinations: GRE general test, GRE advanced biology subject test, and oral diagnostic examination. Foreign students must submit TOEFL scores.
- Prerequisite: master's degree in field or equivalent.

Requirements for Degree.

- Credit hours (42 minimum): 24 course work hours beyond the master's degree plus 18 hours of dissertation (Botny 799R or Range 799R). **Note:** Individuals with an MS at BYU who wish to obtain a PhD here must go elsewhere for one year (30 semester hours).
- Required course: Botny 691R or Range 691R (each semester of residence).
- Skill requirement: includes 21 hours in skill subject area of foreign languages, mathematics, statistics, geography, and/or computer science.
- Dissertation: standard university dissertation format or journal publication format.
- Examinations: (A) defense of research design; (B) comprehensive written and oral examinations on completion of skill requirement and course work.
- Oral defense of dissertation.

Molecular Biology Program—MS or PhD

Graduate degrees in molecular biology at Brigham Young University are coordinated by the Molecular Biology Program in the College of Biology and Agriculture. This degree prepares students in the philosophy, procedures, and tools used to perform biological research at the molecular level. Students may specialize in plant molecular biology by working with faculty in the Department of Botany and Range Science. Thesis research will focus on molecular approaches to understanding patterns of inheritance, as well as developmental and physiological processes in plants.

Admission and Entry.

Students should apply to the Molecular Biology Program in the college and designate their preferred area of specialization as Botany or Plant Molecular Biology. See Admission and Entry requirements in the Molecular Biology section of this catalog.

Requirements for Degree.

See Requirements for Degree in the Molecular Biology section of this catalog.

FINANCIAL ASSISTANCE

Financial assistance is available for these programs through the Department of Botany and Range Science. Other financial aid is available through the university. Financial assistance is available for superior students in the form of teaching assistantships, research assistantships, internships, and competitive scholarships. Contact graduate coordinator for specific information concerning possibilities for support.

RESOURCES AND OPPORTUNITIES

BYU Agriculture Station. The station encompasses several sites, all of which support research in basic and applied agriculture. At these facilities, research can be conducted on agriculture crops, shrubs and trees, rangeland forages, and plant interactions with domestic animals.

Ezra Taft Benson Agricultural and Food Institute. The major objective of the Ezra Taft Benson Agriculture and Food Institute is to raise the quality of life among the people of the world through improved nutrition and enlightened agricultural practices. Research to improve agricultural practices, family nutrition, and appropriate technology is encouraged.

M. L. Bean Life Science Museum. Extensive biological and zoological collections are housed in the M. L. Bean Life Science Museum. The exhibits include habitat studies of local as well as exotic plant and ani-

mal species and a large and valuable collection of trophies from North America, Africa, and Asia.

Electron Optics Laboratory. In this lab researchers can accomplish all standard electron optics procedures. The laboratory has transmission and scanning electron microscopes equipped with X-ray microanalysis capabilities, plus accessory equipment for freeze-fracture, freeze-drying, and necessary support facilities, including confocal laser scan microscopy.

USDA Forest Service Shrub Science Laboratory. Housed on the BYU campus, this lab supports one of the finest research programs on native shrubs in the world. Here eleven PhD research scientists with adjunct faculty appointments work with BYU faculty members and graduate students. Laboratories, greenhouses, and gardens on campus and around the state support studies on desert shrubs.

Lytle Ranch Preserve. Graduate students are able to do year-round on-site research on desert plants and animals at the Lytle Ranch. This large preserve is located in the moderate desert climate of southwestern Utah.

On the Provo campus are greenhouses, gardens, an arboretum, a small animal vivarium, and a tissue culture room. Laboratory facilities include gas chromatography-mass spectrometers, isotope ratio mass spectrometers, transmission and scanning electron microscopes, ultracentrifuges, visible ultraviolet and infrared spectrophotometers, gas chromatographs, high-performance liquid chromatographs, infrared gas analyzers, atomic absorption spectroscopy, and many other items.

Faculty and graduate students are engaged in a number of significant and interesting research projects, funded both externally and internally. Some of these are: iron uptake by plants; shrub genetics, ecology, and physiology; biochemical ecology; medicinal plants; ethnobotany; photosynthetic rate and water-use

efficiency in plants; plant growth regulators; forage research; molecular biology of gene expression in mitochondria; marine and freshwater biology; biological science education; effect of nutrient intake on gene expression; environmental science; structural plant science; plant reproductive biology; conservation of rare species.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

Botany

500. (Botny-Range) Physiological and Chemical Ecology. (3)

Prerequisite: Biol 130, Botny 350 (or equivalents), or instructor's consent.

Ecophysiological response of plants to their environment.

507. International Issues in Conservation Biology. (3)

International environmental problems, examining major degradational threats and options for preservation. Environmental, political, and social costs and benefits of development in underdeveloped countries.

510. Advanced Taxonomy. (3)

Prerequisite: Botny 210 or instructor's consent.

Review of taxonomic literature and research methods. One three-day field trip arranged.

515. (Botny-Range) Agrostology: Taxonomy and Ecology of Grasses. (3)

Prerequisite: Botny 210.

Classification and ecology of grasses, emphasizing important forage species.

520. Ethnobotany. (3)

Prerequisite: Botny 120.

Use of plants by diverse human cultures. Integration of current anthropological and botanical literature, emphasizing ethnotaxonomies, survival strategies, and ethnomedicine.

521. Ethnobotany Practicum. (1-5)

Prerequisite: Botny 520.

Ethnobotanical research. May require field trip outside continental U.S. Emphasizes participant observation, interviewing techniques, documentary video and film, botanical collecting techniques, and chemical extraction.

522. Biological Instrumentation. (2)

Prerequisite: graduate status or instructor's consent.

Theory and application of research instruments to biological problems.

523. Biological Instrumentation Laboratory. (2)

Prerequisite: Botny 522 or concurrent registration.

Operating research instruments.

524. Plant Reproductive Ecology. (3)

Prerequisite: Biol 130, Botny-Zool 350, or equivalents.

Plant reproductive ecological theory: floral structure, gender distribution, pollen transfer, seed dispersal, and reproductive success in plants.

525. Plant Development. (3)

Prerequisite: Botny 342 or equivalent.

Molecular and genetic interactions in plant development.

527. (Botny-Range) Wildland Shrubs. (3)

Taxonomy and ecology of wildland shrubs. Field trip required.

530. Scanning Electron Optics. (3)

Prerequisite: instructor's consent.

Scanning electron microscopy of biological, physical science, and engineering samples, emphasizing practical applications.

531. Transmission Electron Optics. (3)

Prerequisite: instructor's consent.

Transmission electron microscopy of biological, physical science, and engineering samples, emphasizing practical applications.

534. Lichenology. (3)

Detailed study of lichens, including classification, morphology, and ecology. Field trip required.

539. Paleobotany. (3)

Prerequisite: Botny 105, Geol 103.

Morphology and relationships of fossil plants.

540R. Advanced Topics in Plant Physiology. (3)

Prerequisite: Botny 440 or instructor's consent.

550. Plant Geography. (3)

Distribution of plant species and communities in light of present and past climates.

551. (Botny-Range-Zool) Quantitative Ecology. (3)

Prerequisite: Botny-Zool 350 or equivalent, Stat 222, 501, or concurrent registration.

Practical quantitative methods necessary for ecological data analysis.

552. (Botny-Range) Terrestrial and Rangeland Ecosystems. (4)

Prerequisite: Botny-Zool 350 or equivalent; Stat 221, 222, or 501.

Biotic communities of the earth; population dynamics; reproductive, life-form, and longevity patterns; species interactions; structure, dynamics, and evolution of communities.

554. Population and Conservation Biology. (3)

Prerequisite: Botny-Zool 350 or equivalent.

Analysis of populations in natural settings; theoretical and practical strategies for conservation of endangered biota and preservation of biodiversity.

559. (Botny-AgHrt) Advanced Plant Breeding and Biotechnology. (3)

Prerequisite: Botny 341; AgHrt-Botny 459; or equivalents. Recommended: AgHrt-Botny 485 or equivalent.

Genetics and methods of plant breeding and biotechnology related to improving agronomic and horticultural crops.

561. (Botny-Range) Watershed Management. (3)

Prerequisite: Range 354, Botny 350, or equivalents.

Water-producing characteristics of forest and rangelands, emphasizing laboratory and field studies of soil and vegetation.

565. (Botny-Range) Wildlife Behavioral Ecology. (3)

Prerequisite: Biol 130, Range 354, Botny 350, or equivalents.

Integration of the principles of ethology, sociobiology, and behavioral ecology using examples from wildlife and livestock. Behavioral sampling methods stressed. Field trip required.

568. (Botny-Range) Restoration Ecology. (3)

Recommended: AgHrt 282, Range 354, 466, Botny 350, or equivalents.

Nature of ecosystem disturbance and plant succession. The developing science and practice of ecological restoration. Case studies of upland and riparian restoration. Field trips required.

573. (Botny-AgHrt) Plant Cytogenetics. (3)

Prerequisite: Botny 341, 342, 343; AgHrt-Botny 559; or equivalent.

Plant chromosome morphology and structure, polyploidy, aneuploidy, replication and endoreduplication, classical and molecular cytogenetic analytical methods, chromosome evolution, and chromosome engineering.

574. (Botny-AnSc) Introduction to Population Genetics. (3)

Prerequisite: introductory courses in genetics and statistics.

Quantitative study of factors influencing changes in gene frequencies in natural and domestic animal and plant populations.

598R. Directed Readings. (1-3)

Historical and contemporary literature.

610. Botanical Terminology and Nomenclature. (2)

Prerequisite: instructor's consent.

Botanical terminology, including the contributions of Latin and Greek words, their gender, number, and case.

630. Angiosperm Morphology. (4)

Prerequisite: familiarity with taxonomy, anatomy, and physiology or biochemistry.

Structures, relationships, and evolution of flowering plants.

650R. Advanced Plant Ecology. (2)

Current trends in ecological research and philosophy.

678. Organic Evolution. (3)

Prerequisite: introductory course in genetics or instructor's consent.

691R. Graduate Seminar. (1)

697R. Special Problems. (1-6)

Advanced study of botanical topics: genetics, plant biochemistry, ecology, evolutionary biology, plant-herbivore interactions, systematics, and anatomy-morphology.

698R. Master's Project. (1-6)

699R. Master's Thesis. (1-9)

799R. Doctoral Dissertation. (1-9)

Range Science

500. (Range-Botny) Physiological and Chemical Ecology. (3)

Prerequisite: Biol 130, Botny-Zool 350, or equivalents, or instructor's consent.

Ecophysiological response of plants to their environment.

505. Wildlife Law Enforcement. (3)

Prerequisite: Biol 130 or equivalent.

Current and historical principles of federal and state wildlife law enforcement, case development, evidence, evaluation, human rights, and testimony.

515. (Range-Botny) Agrostology: Taxonomy and Ecology of Grasses. (3)

Prerequisite: Botny 210.

Classification and ecology of grasses, emphasizing important forage species.

527. (Range-Botny) Wildland Shrubs. (3)

Taxonomy and ecology of wildland shrubs. Field trip required.

551. (Range-Botny-Zool)**Quantitative Ecology. (3)**

Prerequisite: Botny-Zool 350 or equivalent; Stat 222, 501, or concurrent registration.

Practical quantitative methods necessary for ecological data analysis.

552. (Range-Botny) Terrestrial and Rangeland Ecosystems. (4)

Prerequisite: Botany-Zool 350 or equivalent; Stat 221, 222, or 501.

Biotic communities of the earth; population dynamics; reproductive, life-form, and longevity patterns; species interactions; structure, dynamics, and evolution of communities.

560. Wildlife and Wetlands Ecology and Management. (3)

Prerequisite: Biol 130, Botny 210, Range 225; Range 354 or Botny 350; or equivalents.

Characterization and interactions of wildlife and plant populations in typical wetlands; emphasizes ecological functions, maintaining biodiversity, and restoration of degraded systems. Field trips required.

561. (Range-Botny) Watershed Management. (3)

Prerequisite: Range 354, Botny 350, or equivalents.

Water-producing characteristics of forest and rangelands, emphasizing laboratory and field studies of soil and vegetation.

565. (Range-Botny) Wildlife Behavioral Ecology. (3)

Prerequisite: Biol 130, Range 354, Botny 350, or equivalents.

Integration of the principles of ethology, sociobiology, and behavioral ecology using examples from wildlife and livestock. Behavioral sampling methods stressed. Field trip required.

568. (Range-Botny) Restoration Ecology. (3)

Recommended: AgHrt 282, Range 354, 466, Botny 350, or equivalents.

Nature of ecosystem disturbance and plant succession. The developing science and practice of ecological restoration. Case studies of upland and riparian restoration.

691R. Graduate Seminar. (1)**697R. Special Problems. (1-6)**

Advanced study of selected range topics: fire ecology, grazing systems, wetlands and wildlife, ecology, evolutionary biology, plant herbivore interactions, and wildlife behavioral ecology.

699R. Master's Thesis. (1-9)**799R. Doctoral Dissertation. (1-9)****FACULTY**

ANDERSON, VAL JO, *Associate*

Professor. PhD, Texas A&M

University, 1989. Range Ecology; Ecophysiology.

BROTHERSON, JACK D., *Professor.*

PhD, Iowa State University of

Science and Technology, 1969.

Community Ecology; Range Management.

CATES, REX G., *Professor.* PhD,

University of Washington, 1971.

Plant/Herbivore Interactions; Ecological Chemistry.

COLEMAN, CRAIG E., *Assistant*

Professor. PhD, Pennsylvania State

University, 1992. Plant, Molecular,

Cellular, and Developmental Biology.

COX, PAUL ALAN, *Professor.* PhD,

Harvard University, 1981. Plant

Evolutionary Ecology;

Ethnobotany.

FAIRBANKS, DANIEL J., *Associate*

Professor. PhD, University of

Arizona, 1988. Genetics; Plant

Breeding; Biotechnology.

FLINDERS, JERRAN T., *Professor.* PhD,

Colorado State University, 1971.

Wildlife Behavior; Wildlife

Habitat.

GARDNER, JOHN S., *Research Professor.*

PhD, Brigham Young University,

1978. Electron Optics; Fungal

Ultrastructure.

HESS, WILFORD M., *Professor.* PhD,

Oregon State University, 1962.

Electron Optics; Ultrastructure;

Plant Pathology.

ROUNDY, BRUCE A., *Professor.* PhD,

Utah State University, 1984.

Revegetation; Restoration

Ecology.

RUSHFORTH, SAMUEL R., *Professor.*

PhD, Brigham Young University,

1970. Algology; Evolutionary

Morphology; Environmental

Policy.

ST. CLAIR, LARRY LEE, *Professor.* PhD,

University of Colorado, 1984.

Cryptogams; Environmental

Biomonitoring.

SMITH, BRUCE N., *Professor.* PhD,

University of Washington, 1964.

Plant Physiology; Growth and

Respiration.

TIDWELL, WILLIAM D., *Professor.* PhD,

Michigan State University, 1966.

Paleobotany; Anatomy.

WEBER, DARRELL JACK, *Professor.*

PhD, University of California,

Davis, 1963. Plant Biochemistry;

Pathology; Xerophyte Physiology.

WELSH, STANLEY L., *Professor.* PhD,

Iowa State University of Science

and Technology, 1960. Plant

Systematics; Western American

and Polynesian Floras.

WOOLSTENHULME, LOREEN ALLPHIN,

Assistant Professor. PhD,

University of Utah, 1996. Plant

Ecology; Plant Reproductive

Biology; Conservation Genetics.

BUSINESS ADMINISTRATION

Program Director: Henry J. Eyring

640 TNRB
Provo, UT 84602-3113
(801) 378-3500
Fax (801) 378-4808
E-mail: mba@byu.edu

THE PROGRAM OF STUDIES

The Master of Business Administration Program is administered by the Marriott School. It is a two-year program designed to prepare the graduate student for a career in business. The program focuses on four areas—globalization, integration, technology, and entrepreneurship. Increasingly, international focus and entrepreneurship are encouraged to better prepare the student for the world of business. Currently the program presents a new and exciting approach to teaching business management. Courses are integrated across disciplines in order to use faculty expertise from different points of view. Concept days are alternated with case study days to improve practical application.

The curriculum has been designed to achieve the twofold task of giving the student (1) a general management education and (2) depth in area(s) bearing specifically on personal professional interests.

Students who complete the program will have (1) acquired an understanding of business and management tools and principles that have enduring significance in a changing environment, (2) developed advanced knowledge in a field of concentration in the area of the student's major interest, (3) achieved an understanding of the utilization of quantitative methods and behavioral sciences in the solution of business problems, (4) obtained skills in critical analysis and careful reasoning, and (5) strengthened their ability to communicate effectively.

In addition to the MBA, the Marriott School offers an Executive Option MBA, a joint JD/MBA, a joint MBA/MA in international area studies, and a joint MBA/MS in mechanical or manufacturing engineering.

Business Administration—MBA

MBA classes are generally not available to students other than those in the following programs: master of business administration, juris doctor/master of business administration, master of public administration, master of accountancy, master of business administration/master of arts in international and area studies, or master of organizational behavior. All first-year MBA classes are required for graduation.

Admission and Entry.

- Semesters of entry and application deadlines: fall, January 15, priority deadline (U.S. and international); March 1, final deadline (U.S.).
- Application requirements: entrance examination is the GMAT.
- GPA: minimum 3.0 on 4.0 scale.
- Prerequisite: baccalaureate degree from an accredited institution and a background in college algebra or calculus, accounting, economics, and statistics, and a basic course in computer skills.
- In addition to the above, the Executive MBA Option requires a minimum three years of full-time managerial experience.

Requirements for Degree.

- Required courses:
First-Year Program: courses in financial management, marketing management, operations management, managerial economics, macroeconomics and the business environment, business and government, managerial accounting, quantitative methods, computers and management, organizational behavior, written and oral communication, management simulation, and the MBA Management Seminar.
Second-Year Program: courses in business policy, business and soci-

ety, and the MBA Management Seminar.

- Electives: see MBA or executive MBA policies and procedures publications.
- Emphases: Entrepreneurship, Corporate Finance, Investment Management, Management of Financial Institutions, Marketing Research and Analysis, Marketing Management, Management Information Systems, Organizational Behavior, Strategic Management, Production and Operations Management, Quantitative Methods.

Executive Option—MBA

The Executive Master of Business Administration Option is a rigorous program in general management for fully employed professionals. Designed for managers and professionals who typically have at least from three to four years of full-time managerial work experience, it consists of courses similar to the full-time MBA Program but is unique in reflecting the work and management experience of its students.

Obtaining an MBA degree through the Executive MBA Option requires a year-round commitment for two years. Class sessions are generally held two evenings each week and occasionally on Saturdays. Students spend one residency week on campus each year in a complex case analysis and other concentrated study. Executive MBA classes are generally not available to students in other programs. Special requests should be made to the Executive MBA Policy Committee, c/o the Executive MBA Office. For details concerning admission requirements and application dates, consult the Executive MBA Office, 637 TNRB, Provo, UT 84602-3012; telephone (801) 378-3622; fax (801) 378-7830; e-mail: emba@byu.edu.

Joint Program—MBA/JD, MBA/MA, MBA/MS

Three joint degrees are offered in connection with the MBA degree. The MBA/JD is a program in busi-

ness administration and law offered with the J. Reuben Clark Law School. The MBA/MA is a program of business administration and international and area studies sponsored by the David M. Kennedy Center for International Studies. The MBA/MS is a program of business administration, mechanical and manufacturing engineering, and industrial design.

Inquiries about any of these programs should be directed to the MBA Office. No joint degrees are available in combination with the Executive MBA Option.

FINANCIAL ASSISTANCE

The MBA Program utilizes the Marriott School's financial aid provisions. Qualified students can receive aid from the following: the Marriott School Scholarship Fund, private scholarship donations, assistantship awards, and loan assistance.

Scholarships. The Marriott School currently has over sixty-five private scholarships. Information and applications are available for second-year students in 730 TNRB (deadline: March 31). In addition, the MBA Program awards scholarship funds to first-year students based on academic merit and offers several private MBA scholarships.

Assistantships. Research and teaching assistantships are available for qualified second-year students.

Loans. Several loans are available for Marriott School students:

- Marriott School loans: available to full-time Marriott School day students. Marriott School loans are handled on an individual basis, dependent on financial need and standing within the participating program.
- BYU short-term loans: available for up to the cost of tuition only.
- Federal Stafford loans: subsidized by the U.S. government. Not available for international students.

More information on and applications for these loans are available from the BYU Financial Aid Office, A-41 ASB, (801) 378-4104.

RESOURCES AND OPPORTUNITIES

Business administration students utilize the N. Eldon Tanner Building, which houses the Marriott School. Surrounding the dramatic eight-story atrium at the building's center are lecture and seminar rooms, study rooms, a computer laboratory, and a working library.

The Marriott School is recognized as one of the outstanding management schools in the nation. Faculty are actively engaged in research and publication, and they fill leadership positions in a number of national professional organizations. The school has developed innovative educational programs that include internships, executive visitation programs, special student consulting and research projects, and other activities designed to bring management education and training closer to management practice. This is accomplished, in part, through the Marriott School's National Advisory Council and the Executives on Campus Program.

Consisting of sixty-five to seventy prominent business and government executives, the National Advisory Council lends major support to the Marriott School. Students benefit by interacting with council members in special campus lectures and seminars and by visiting or working with these executives in their respective organizations. Furthermore, the council assists students with placement opportunities, helps develop funding sources for scholarships, and provides professional development for faculty members.

The Executives on Campus Program gives students an opportunity to interact with distinguished business and government leaders who come to campus. These executives visit classes and meet with student organizations as well as participate in the Executive Lecture Series and the Entrepreneurship Lecture Series.

COURSE DESCRIPTIONS

MBA Required Courses

97R. Computer Skills for Managers. (0)

One-week review of computer skills, offered before first semester for those without adequate background. Fee.

500. Corporate Financial Reporting. (2.5)

Analyzing wide variety of financial reporting issues via published corporate financial statements.

501. Financial Accounting. (1.5)

Analyzing financial accounting and reporting issues used by prospective managers.

502. Managerial Accounting 1. (1.5)

Objectives and procedures of cost accounting. Topics include job costing, joint product costing, cost behavior analysis, standard costs, cost allocation problems, and cost data use in management.

510. Managerial Economics. (1)

Application of specific micro-economic principles to business operations in a market economy.

511. Macroeconomics and Business Environment. (2)

Aggregate economic fluctuations and their impact on business decisions.

520. Business Finance 1. (2.5)

Short-term financing of a business operation. Developing techniques for financial planning, such as analysis of ratios, profitability, and liquidity.

521. Business Finance 1. (1.5)

Short-term financing of a business operation. Developing techniques for financial planning, such as analyzing ratios, profitability, and liquidity.

522. Business Finance 2. (1)

Prerequisite: MBA 521.

Continuation of MBA 521, emphasizing capital budgeting, cost of capital, and capital structure.

523. Business Finance 3. (1)

Prerequisite: MBA 522.

Continuation of MBA 522, emphasizing efficient markets, introduction to futures and options, risk and insurance, yield curves, and interest rate determinants.

530. Statistical Analysis. (2.5)

Introduction to applied business statistics, emphasizing hypothesis-testing techniques and simple and multiple correlation and regression.

533. Operations Management

1. (2.5)

Examining issues and tools in production and operations management. Specific tools for forecasting, planning, inventory control, and project management presented and developed.

535. Introduction to Manager's Tool Kit. (1)

Computer-augmented practical skills for today's managers, including basic modeling and data summarization and graphical and statistical techniques.

540. Organizational Behavior. (2.5)

Analysis of individual, group, and organization variables that inhibit or facilitate effective organizational functioning. Topics include motivation, rewards, leadership, conflict, decision making, structure, evaluation, and change.

550. Marketing Management 1. (2)

Development of analytical marketing tools and techniques; their utilization in case analysis and decision making in marketing management.

551. Marketing Management 1. (2.5)

Using analytical marketing tools and techniques in case analysis; decision making in marketing management.

560R. Integrative Exercise. (0.5)

Integrated applications of case analysis and presentation skills. Students work as groups to analyze cases and formulate recommendations, then make professional presentations to groups representing management.

561. Written and Oral Communication 1. (1.5)

Most frequent business communication techniques. Learning accepted business correspondence and report-writing concepts and developing skills that contribute to effectiveness in oral and written situations in business.

562. Written and Oral Communication 2. (1)

Continuation of MBA 561. Analysis of oral communication techniques in practice and limited theory. Oral presentation experience before video cameras with expert feedback. Self-improvement in written and oral communications.

569. Basic Quantitative Skills. (0.5)

Basic modeling and data summarization. Utilizing spreadsheets in quantitative business cases.

570. Data Exploration. (1)

Graphical and statistical techniques for extracting managerial insights from business data. Effective communication of quantitative findings for business decision making.

580. Introduction to Strategy. (1.5)

Introduction to strategic planning; concepts, models, and analysis.

582. Strategy 2. (1.5)

Continuation of studies in strategic planning; applying concepts, models, and analysis.

584. Introduction to Global Management. (1)

Foundations in global management integrating strategy, finance, operations, marketing, and human resource management.

585. Management and Technology. (1.5)

Management and control with information technology. Information flow, database design, and use applied to cost controls and managerial decision making.

590R. Consulting Field Study. (1-6)

Working as a team with faculty and management in strategic consulting projects for local, national, and international business.

591. Business, Government, and International Economy. (1.5)

Holistic analysis of environment in which corporations exist and operate: changing economic, political, and social forces and institutions and policies through which different communities influence activities of business.

592. Management Simulation. (1)

Integrating functional areas of business through use of a management simulation game.

593R. Management Seminar. (1)

Invited guests speak on topics of general management interest ranging from ethics, industry problems and opportunities, and government policies to relevant current events.

594. Introduction to Spiritual Issues. (1)

Management issues using spiritual insights from LDS standard works.

680. Business Policy. (3)

Top-management approach to the problems of determining corporate strategy.

682. Ethics, Business, and Society. (3)

Nature of personal and corporate responsibility from perspective of global system in which we all live.

MBA Electives

572. Business Chinese 1. (3)

Prerequisite: fluency in Chinese.

For experienced speakers of Chinese. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

573. Business French 1. (3)

Prerequisite: fluency in French.

For experienced speakers of French. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

574. Business German 1. (3)

Prerequisite: fluency in German.

For experienced speakers of German. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

575. Business Japanese 1. (3)

Prerequisite: fluency in Japanese.

For experienced speakers of Japanese. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

576. Business Korean 1. (3)

Prerequisite: fluency in Korean.

For experienced speakers of Korean. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

577. Business Spanish 1. (3)

Prerequisite: fluency in Spanish.

For experienced speakers of Spanish. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

578. Business Portuguese 1. (3)

Prerequisite: fluency in Portuguese.

For experienced speakers of Portuguese. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

581. Strategic Management. (3)

Top-management approach to problems of determining corporate strategy. Structured for accounting students.

599. Academic Internship: Practicum. (1-9)

Internship providing hands-on experience in management positions.

601. Managerial Accounting. (3)

Emphasis on process costing systems and current costing issues, problems, and applications. Course requires completion of approved project.

602. Federal Income Taxation. (3)

Analysis of business transactions for their tax factors. Basic structure of the law and implications of both personal and corporate income tax.

604. Advanced Information Systems Design. (3)

Prerequisite: ISys 643

Advanced concepts and techniques of systems analysis and design, emphasizing systems development, systems tools, prototyping, and related topics.

605. Advanced Database Analysis and Design. (3)

Advanced database organization, emphasizing conceptual and logical design, semantic modeling, database integrity, and security.

613. Business and Economic Forecasting: Theory and Application. (3)

Forecasting methodologies, emphasizing time series analysis and stressing practical applications.

614. Market Analysis and Decision Making. (3)

Marketing research, economic theory, and statistics in managerial decision making. Understanding management's role in working with technical specialists to improve business planning.

616. Principles of Risk and Insurance. (3)

Identifying, measuring, and dealing with personal risk. Introduction to property/casualty as well as life and health insurance issues and products.

617. Risk Management. (3)

Management of risk exposures in a business setting. Identifying, measuring, and dealing with both traditional insurable risks and financial risks.

618. Personal Financial Planning. (3)

Financial decision making by the household: income tax, retirement and estate planning, investment strategy, portfolio management, and personal risk management. Business interests affecting personal finances.

619. Services Management. (3)

Prerequisite: an introductory operations management course or instructor's consent.

Management principles and characteristics of service industries and service aspects of supply chains. Sources of strategic advantage in services. Process analysis and tools. Service quality.

620. Topics in Finance. (3)

Selected issues in financial management and/or investments.

621. Advanced Corporate Finance. (3)

Issues such as mergers/acquisitions, valuation, financial restructurings, leveraged buyouts, capital structure, international portfolio analysis, tax-driven decisions, leasing, recapitalizations, and industry restructurings.

622. Investments. (3)

Basic principles and techniques of investment analysis and portfolio selection and management. Portfolio policies available to investors.

623. Investment Theory and Evidence. (3)

Modern investment theory and evidence, including asset pricing models, options pricing, the efficient markets hypothesis, portfolio diversification, and performance measures.

624. Capital and Security Markets. (3)

Functions and instruments of capital markets: relationships to money markets, historical background, structures, and analysis of significant economic problems and trends in the markets.

625. Management of Financial Institutions. (3)

Problems and policies of financial institutions, including competition for funds, asset liability management, capital management, strategic diversification, and shaping of competitive strategy.

626. Short-Term Financial Management. (3)

Overview of treasurer's function: cash, liquidity, payables and receivables management; short-term borrowing, electronic data interchange, bank service products, international transactions, and forecasting.

627. International Finance. (3)

Impact that currency, tax, and capital market variations between countries have on sourcing of funds, management of working capital, investment of funds, and protection of assets. Understanding the foreign exchange market.

628. Futures and Options Markets. (3)

Futures markets (with a primary orientation toward commodity speculation) and theory of options pricing; formation and use of options pricing techniques; investment strategies using options.

629. Silver Fund. (3)

Team management of actual investment portfolios for a full year. Responsibility for economic forecasts, security selection, and portfolio strategy. Students apply for a position of management in the spring for the following year. Selections for participation made by faculty committee.

630. Managers Quantitative Tool Kit 1. (3)

Development of computer-augmented practical skills available to today's managers. Modules include modeling, simulation, optimization, survey statistics, forecasting, econometrics, and graphic presentation.

631. Advanced Data Analysis. (3)

Use of standard methods of statistical estimation and inference in analyzing empirical and experimental data. Topics include introduction to experimental design, analysis of variance and covariance, factor analysis, multiple regression, and discriminant analysis.

632. Managers Quantitative Tool Kit 2. (3)

Continuation of Managers Quantitative Tool Kit 1.

633. Operations Management 2. (3)

Completion of operations fundamentals begun in MBA 533. Production and associated management systems that exist in business enterprises.

634. Quality Management. (3)

Concepts of quality management; strategic issues, philosophies, and tools used to implement and control quality.

636. Operations Management Seminar. (3)

Cases, readings, and research on current industrial practices and problems in production and operations management.

637. International Management and Production Techniques. (3)

International manufacturing processes and relationships. Variations that occur in policy and techniques between countries.

638. Strategic Issues in Manufacturing. (3)

Interface of strategy and manufacturing. Topics include: capacity and facilities management, work force management, quality management, technology management, vertical integration, manufacturing infrastructure, manufacturing interface with other functions, and incorporating manufacturing in corporate strategy.

639. Product Development: Market to Concept. (3)

Prerequisite: graduate standing as a student in the MBA, MeEn, or Mfg or instructor's consent.

Strategies, processes, tools, and methods in product development, focusing on initial stages of market and competitive assessment to concept development.

641. Private Enterprise and Community Service. (3)

Sacred (scripture-based) and secular (theory-based) models of community service. Designing and implementing a meaningful community service project.

647. Advanced Seminar in Organizational Behavior. (1-3)

Varied topics may include conflict resolution, power and influence, intergroup relations, career development and planning, and management skills.

649 (MBA-OrgB 531). Managing Entrepreneurial Firms and Family Businesses. (3)

Issues and problems faced by managers of entrepreneurial enterprises and leaders of family-owned businesses.

650. Marketing Research and Information Systems. (3)

Consulting course that blends marketing theory and practice and for which a commissioned, proprietary, marketing research project is the major component. Problem identification and definition, descriptive research techniques, uni- and multivariate analysis, and development of actionable recommendations based on market data.

651. Internet Marketing. (3)

Marketing strategy for business on the internet: marketing research, sales, and promotional concepts.

652. Quantitative Methods and Market Analysis. (3)

Applying quantitative methods in marketing analysis, including various forecasting procedures, multidimensional scaling, multiple discriminant analysis, Bayesian decision making, analysis of variance, regression and correlation, and other techniques.

653. Seminar in Marketing. (3)

Intensive study of selected marketing topic such as international marketing, social issues in marketing, government regulation of marketing, sales forecasting, institutions and channels, marketing in nonbusiness organizations, marketing theory, and marketing models.

654. Sales Management. (3)

Personal selling and sales management, including strategic role of personal selling; business-to-business selling; organizing, directing, and compensating the sales force; and evaluating sales performance.

655. Retailing Management. (3)

Management perspective of retail strategy, merchandising, inventory management, promotion, location, and control. For those planning a retailing career.

656. Business Negotiating. (3)

Managerial negotiating skills through frequent student one-on-one and group negotiations that are videotaped and then reviewed.

657. Product Management. (3)

Developing and managing consumer and international products: product selection, line planning, brand management, packaging, market testing, government regulations, market launch, and competitive strategy.

658. International Marketing. (3)

Institutions and techniques related to marketing goods and services in other countries: international dimensions of product, price, distribution channels, and promotion as they are adjusted to meet social, cultural, and political environments found in other countries.

659. Business-to-Business Marketing. (3)

Company and institutional markets, managing R&D and technical product development, building and managing customer relationships and service, and competitive bid pricing in business market environment.

660. Strategic Marketing and Planning. (3)

Strategic market analysis and development and implementation of a strategic marketing plan for a new product, new business, or an ongoing operation.

666. Managing Human Resource Strategically. (3)

Understanding key human resource activities (selection, training, appraisal, compensation, and development) and how managers can use them to help formulate and implement strategies.

671. Entrepreneurial Perspective. (3)

Developing awareness of and ability to apply existing knowledge about entrepreneurship to make better decisions when starting, growing, and harvesting business ventures.

672R. Business Chinese 2. (1.5)

Prerequisite: fluency in Chinese.

For experienced speakers of Chinese. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

673R. Business French 2. (1.5)

Prerequisite: fluency in French.

For experienced speakers of French. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

674R. Business German 2. (1.5)

Prerequisite: fluency in German.

For experienced speakers of German. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

675R. Business Japanese 2. (1.5)

Prerequisite: fluency in Japanese.

For experienced speakers of Japanese. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

676R. Business Korean 2. (1.5)

Prerequisite: fluency in Korean.

For experienced speakers of Korean. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

677R. Business Spanish 2. (1.5)

Prerequisite: fluency in Spanish.

For experienced speakers of Spanish. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

678R. Business Portuguese 2. (1.5)

Prerequisite: fluency in Portuguese.

For experienced speakers of Portuguese. Emphasis on business concepts, practice, and case study—including conversing, reading, and presenting—while enriching business vocabulary.

679. Creating and Managing New Ventures. (3)

Key issues and problems facing managers in start-up companies. Team-taught by professors and entrepreneurs; particularly helpful for students starting businesses.

684. Global Management 1. (3)

Foundation course for students interested in global management—international finance, operations, marketing, and strategy taught in an integrated format.

685. Global Management 2. (3)

Prerequisite: MBA 684.

Continuation of Global Management 1.

686. Real Estate Management. (3)

Applying principles and techniques of property investments, including determining value, financing arrangements, and marketing and management problems.

688. Applied Econometrics. (3)

Prerequisite: ManEc 300, 301, calculus or equivalent, and a first course in econometrics.

Econometric techniques and applications.

689. Business Law. (3)

Introduction to body of law that governs behavior of corporate executives in their relations with board of directors, stockholders, and general public.

690R. Management Field Study. (3)

Experience working with faculty and management in assisting businesses with specific projects.

692. Business in History. (3)

Origins of modern business and corporate activity in Europe; development of modern business in the United States; and use of historical analysis as a tool for management. Lectures, readings, cases, and discussions of entrepreneurs, corporations, and industries.

693R. Readings and Conference. (1-3)

Subject to be arranged with instructor. Approval must be obtained from the MBA Office.

Executive MBA Required Courses

500. Introduction to Management. (2.5)

Five days on campus emphasizing the broad range of managerial issues and decisions.

501. Management Fundamentals 1. (9)

Major business concepts and tools of finance, organizational behavior, marketing, operations, information systems, communications, micro- and macroeconomics.

502. Management Fundamentals 2. (9)

Continuation of Management Fundamentals 1.

503. Management Integration. (7)

Taught concurrently with the two Management Fundamentals courses. Relates functional concepts to each other and the business environment.

600. Introduction to Strategy. (4)

Tools and concepts for strategy formulation and implementation; industry analysis and role of general manager. Intensive week on campus required.

610. Business, Government, and International Economics. (3.5)

Analysis of environment in which corporations exist and operate—changing economic, political, and social forces.

680. Business Policy. (3)

Top-management approach to problems of determining corporate strategy.

684. International Management. (4)

Aspects of conducting business in a global environment, culminating with an international excursion visiting companies in several countries.

687. Global Management 1. (2.5)

Why companies get involved in international business; different entry strategies companies use. Focus on country analysis.

689. Global Management 2. (2)

Capstone course on global management focusing on financial analysis, marketing analysis, organizational strategy, and human resource management.

690. Management Practicum. (3)

Applying management concepts by working in groups on multi-disciplinary projects with their own companies.

693. Selected Topics in Management. (0.5-6)

Subject(s) to be determined by instructor.

Executive MBA Electives

612. Managing Information Technology. (2)

Impact of information technology, trends in business, the strategic role, and managing the development of information technology.

620. Corporate Financial Strategy. (3)

Important problems surrounding issues of financial strategy and tactics confronting top financial and general managers.

621. Money, Financial Institutions, and Economic Activity. (2)

Economic analysis of effects of money, banking, and financial institutions on business decisions and aggregate economic activity.

622. Investments. (2)

Review of modern investment theory. Practical study of principles and techniques of investment analysis, portfolio selection, and management.

625. Strategic Issues in Manufacturing. (2)

Competitive approach to the manufacturing function.

630. Personal Finance/Risk Management. (2)

Financial decision making by the household, including how business interests and risk affect personal finances.

632. Corporate Entrepreneurship/Innovation. (2)

Fostering innovation and change within existing corporations, including challenge of motivating workers to deal with changing environments.

635. Introduction to Business Negotiation. (2)

Principles and processes of conducting negotiations in business.

638. Technical Management, Project Management and Services. (3)

Manufacturing process and product development, time to market, rapid response manufacturing and distribution, and the unique requirements of service businesses.

640. Advanced Seminar in Organizational Behavior. (3)

Special topics or problems in organizational behavior, e.g., conflict resolution, power and influence, intergroup relations, career development, and planning or management skills.

645. Economics of Strategy. (2)

Strategic formulation of boundaries of the firm, market and competitive analysis, and strategic position and dynamics.

650. Seminar in Marketing. (3)

Selected marketing topics such as international marketing, government regulation of marketing, marketing theory, and marketing models.

651. Strategic Marketing Planning. (2)

Strategic market analysis and development and implementation of strategic marketing plan for a new product, new business, or ongoing operation.

655. Manager's Tool Kit. (2)

Developing computer-augmented practical skills available to today's managers. Modules include modeling, simulation, optimization, survey, statistics, forecasting, econometrics, and graphic presentation.

660. Advanced Operations Management. (3)

Presentations and discussion of classical and current models and solution techniques in production and operations management.

662. Product Management Tool Kit. (2)

Developing and managing consumer and international products: product selection, line planning, brand management, packaging, market testing, government regulations, market launch, and competitive strategy.

665. Building Competitive Advantage Through People. (2)

Staffing and training for competitive advantage in the global business environment. The fit between strategy, structure, and human resource practices.

669. Advanced Seminar in Managing Service Quality. (2)

Managing service quality in the firm. Paradigm shift from command-and-control models to importance of climate and culture.

670. Influencing Public Policy. (2)

Understanding issues and effects of public policy and how managers can work to affect policies.

671. Entrepreneurial Perspective. (3)

Developing awareness of and ability to apply existing knowledge about entrepreneurship to make better decisions when starting, growing, and harvesting business ventures.

682. Ethics, Business, and Society. (2-3)

Nature of personal and corporate ethical responsibility from perspective of global system.

686. Real Estate Management. (2)

Applying principles and techniques of property investments: determining value, arranging financing, and solving marketing and management problems.

693. Selected Topics in Management. (3)

Subject(s) to be determined by instructor.

FACULTY

Faculty in the Marriott School teaching in the business program:

ADOLPHSON, DONALD L., *Professor.* PhD, University of Wisconsin, Madison, 1968, 1973. Business Strategy.

ANDRUS, ROMAN R., *Professor.* PhD, Columbia University, 1965. Marketing.

BLOOD, DWIGHT M., *Professor.* PhD, University of Michigan, 1963. Micro and Macro Theory; Macro Policy; Finance.

BRADY, F. NEIL, *Professor.* PhD, University of Texas, Austin, 1978. Organizational Theory.

BRYSON, PHILLIP J., *Professor.* PhD, Ohio State University, 1967. Finance.

CALL, IVAN T., *Professor.* DBA, Indiana University, Bloomington, 1969. Financial Management; Management of Financial Institutions.

CHERRINGTON, DAVID J., *Professor.* DBA, Indiana University, Bloomington, 1970. Personal Management.

CLARKE, DARRAL G., *Professor.* PhD, Purdue University, 1972. Strategy Paradigms; Market Analysis and Decision Making; Planning for Small Businesses.

CRAWFORD, ROBERT G., *Associate Professor.* PhD, Carnegie-Mellon University, 1975. Business Economics.

DAINES, ROBERT H., *Professor.* DBA, Indiana University, 1966. Finance and Strategy.

DYER, W. GIBB, JR., *Professor.* PhD, Massachusetts Institute of Technology, 1984. Organizational Culture.

FAWCETT, STANLEY E., *Associate Professor.* PhD, Arizona State University, 1999. International; Operations.

GIAUQUE, WILLIAM C., *Professor.* DBA, Harvard University, 1972. Quantitative Business Analysis.

GODFREY, PAUL C., *Assistant Professor.* PhD, University of Washington, 1994. Strategic Development; Philosophy of Science and Management; Organizational Theory.

GREGERSEN, HAL B., *Associate Professor.* PhD, University of California, Irvine, 1989. Organizational Change.

HANSEN, MARK H., *Assistant Professor.* Texas A&M, 1996. Strategic Alliances; Trust and Cooperation; Strategy and Entrepreneurship Issues.

HANSON, GARTH, *Associate Lecturer.* PhD, University of Nebraska, 1973. Marketing and Organizational Behavior.

HANSON, KAYE T., *Assistant Professor.* PhD, Brigham Young University, 1983. Oral Communication.

HART, DAVID KIRKWOOD, *Professor.* PhD, Claremont Graduate School, 1965. Ethics; Organization Theory.

HARTMAN, LARRY D., *Associate Professor.* EdD, Oklahoma State University, 1973. Communication.

HEATON, HAL B., *Associate Professor.* PhD, Stanford University, 1983. Finance.

HILL, NED C., *Professor.* PhD, Cornell University, 1976. Finance.

HOLMES, ANDREW, *Assistant Professor*. PhD, University of Houston, 1992. Finance.

HUNT, H. KEITH, *Professor*. PhD, Northwestern University, 1972. Marketing.

JACKSON, W. BURKE, *Associate Professor*. PhD, Stanford University, 1978. Manufacturing Strategy; Production and Operation Management; Business Strategy and Business Policy.

KIRKHAM, KATE L., *Associate Professor*. PhD, Union Graduate School, 1977. Organizational Development.

LAMBERT, WILLIAM R., *Associate Professor*. DBA, Indiana University, Bloomington, 1968. Investments.

LEE, TERRY N., *Associate Professor*. PhD, University of Washington, 1973. Production; Quantitative Methods.

McKINNON, GARY F., *Professor*. PhD, University of Texas, Austin, 1968. Marketing.

McQUEEN, GRANT R., *Associate Professor*. PhD, University of Washington, 1989. Finance.

MERRILL, CRAIG, *Assistant Professor*. PhD, University of Pennsylvania, 1994. Finance; Insurance.

NADAULD, STEPHEN D., *Professor*. PhD, University of California, Berkeley, 1978. Finance.

NELSON, RAY D., *Associate Professor*. PhD, University of California, Berkeley, 1975. Managerial Economics.

PINEGAR, J. MICHAEL, *Professor*. PhD, University of Utah, 1982. Finance.

RADEBAUGH, LEE H., *Professor*. DBA, Indiana University, Bloomington, 1973. International; Accounting.

RHOADS, GARY K., *Associate Professor*. PhD, Texas Tech University, 1988. Marketing.

SAMPSON, SCOTT E., *Assistant Professor*. PhD, University of Virginia, 1993. Operations.

SANDERS, W. GERARD, *Assistant Professor*. PhD, University of Texas, Austin, 1996. Corporate Governance, Mergers and Acquisitions, Executive Compensation.

SAWAYA, WILLIAM J., JR., *Associate Professor*. PhD, Arizona State University, 1971. Operations Management.

SCHILL, RONALD L., *Professor*. PhD, University of Oregon, 1971. Industrial Marketing/Procurement; Sales Management.

SEAWRIGHT, KRISTIE W., *Assistant Professor*. PhD, University of Utah, 1993. Operations.

SMITH, MILTON E., *Professor*. PhD, University of Utah, 1981. Management of Financial Institutions; Insurance.

SMITH, SCOTT M., *Professor*. PhD, Pennsylvania State University, 1979. Marketing.

STICE, JAMES D., *Associate Professor*. PhD, University of Washington, 1988. Financial Accounting.

STONE, BERNELL K., *Professor*. PhD, Massachusetts Institute of Technology, 1968. Finance.

SWENSON, MICHAEL J., *Associate Professor*. PhD, University of Oregon, 1980. Marketing.

SWINYARD, WILLIAM R., *Professor*. PhD, Stanford University, 1976. Marketing; Consumer Behavior.

THORLEY, STEVEN R., *Associate Professor*. PhD, University of Washington, 1991. Finance.

WHITLARK, DAVID B., *Assistant Professor*. PhD, University of Virginia, 1990. Marketing.

WILSON, BRENT D., *Associate Professor*. DBA, Harvard University, 1969. International Business.

WORSHAM, RONALD G., *Assistant Professor*. PhD, University of Florida, 1994. Tax.

CHEMICAL ENGINEERING

Chair: Kenneth A. Solen
Graduate Coordinator: Thomas H. Fletcher

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 Provo, UT 84602-4100
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THE PROGRAM OF STUDIES

The Department of Chemical Engineering at BYU is housed in the five-story Clyde Building, a multi-million dollar, 176,000-square-foot engineering center of classrooms, office space, and laboratories. State-of-the-art equipment, modern labs, and many support facilities help achieve the growing recognition the department receives from around the country. The department prides itself on the level and quality of cutting-edge research with which its faculty members are involved. Funding for departmental research is over \$2 million per year, with faculty and graduate students publishing results of technically innovative and scientific research in a multitude of reviewed journal articles and books each year. This department is the home of an NSF Engineering Research Center focusing on the area of combustion. There are also strong research programs in catalysis, thermodynamics, and bioengineering.

The Department of Chemical Engineering offers two degrees: Chemical Engineering—MS and Chemical Engineering—PhD. The department also offers an integrated master's program.

The department has approximately forty graduate students. The typical length of study in the department is two and a half years for an MS degree and four and a half years for a PhD degree.

Chemical Engineering—MS

An MS in chemical engineering prepares the student for a wide variety of employment experiences in industry, all the way from plant operation

to plant design. Employment opportunities in research may also be available to qualified MS graduates. Usually employment is readily available, and starting salaries are slightly higher than for BS graduates. The MS degree is designed to give the student a solid foundation in chemical engineering principles and a strong research experience. For students desiring design experience rather than research experience, the MS degree with design emphasis is available. See the Chemical Engineering Graduate Student Handbook for details.

Admission and Entry.

- Semesters of entry and application deadlines for U.S. and Canadian students seeking financial aid and for international students: fall, February 15; winter, June 15; spring, October 15. For U.S. or Canadian students not seeking financial aid, later deadlines apply, but the applicant should contact the department as soon as possible. For applicants with a BS in a major other than chemical engineering, application for spring term is recommended.
- Entrance examinations: there is no entrance examination for applicants who hold a BS from U.S. or Canadian schools. However, international applicants must submit general GRE and TOEFL scores.
- Prerequisite: BS degree (or equivalent) in chemical engineering from a school accredited by the Accreditation Board for Engineering and Technology (ABET), with a minimum 3.0 GPA in upper-division chemical engineering courses and a minimum 3.3 GPA in all courses. A BS degree in other engineering fields, chemistry, physics, materials science, or metallurgy requires provisional admission.

Requirements for Degree.

- Credit hours: minimum 30 hours including 6 thesis hours (ChEn 699R). No more than 9 hours of 300–499 level course work will apply toward the master's degree.

- Required courses: ChEn 501, 531, 533, 535, 691R (every semester) and electives (13–15 hours). For requirements of special programs, see the Chemical Engineering Graduate Student Handbook.
- Residency requirement: residency is required for the major part of the work toward the master of science thesis. This work must be completed under the specific direction of a graduate faculty member while the student is in residence at BYU (at least two consecutive full-time semesters). "In residence" is defined as (1) being registered for credit as a graduate student and (2) living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty. Further, all work applying toward any master's project or thesis must be completely open for university review and publication. Any exceptions to the above must be supported by written approval from the department and college and obtained in advance of any work being performed.
- Prospectus: each student must submit a written prospectus on his or her proposed thesis topic during the first year of study.
- Thesis.
- Examinations: a comprehensive qualifying examination on graduate engineering course work must be taken and passed, generally at the middle of the second semester of the graduate program (see the Chemical Engineering Graduate Student Handbook). The examination is offered once a year.
- Oral defense of thesis.
- Cumulative GPA: 3.0 or above in all MS degree classes.

Engineering Management—Minor

Offered to MS students in the College of Engineering and Technology, the engineering management minor provides a way to include some elements of modern management in a technical graduate program.

Requirements.

- The minor requires 9 hours selected from the following courses: Mgt 501, 511, 541, 561, 562, 580, 565, or approved Marriott School graduate courses. Students should carefully plan how they will meet the requirements of the minor since these courses are taught only once a year.
- This minor should be declared as part of a student's graduate study list. Admittance approval to enroll in class will be derived from approved graduate study lists.

Chemical Engineering—PhD

A PhD in chemical engineering indicates that the graduate is capable of and qualified to conduct independent and original research in the chemical industries and other related fields. A PhD is nearly always required for someone seeking an academic career. Employment in industry is always available, and starting salaries are considerably higher than for BS or MS graduates. The doctoral program is designed to prepare the student for a lifetime of intellectual inquiry and research and is therefore more rigorous and demanding than the MS program. Students who are dedicated, diligent, and thoughtful and who can work independently are most suited for a PhD in chemical engineering at BYU.

Admission and Entry.

- Semesters of entry and application deadlines for U.S. and Canadian students seeking financial aid and for international students: fall, February 15; winter, June 15; spring, October 15. For U.S. or Canadian students not seeking financial aid, later deadlines apply, but the applicant should contact the department as soon as possible. For applicants with a BS in a major other than chemical engineering, application for spring term is recommended.
- Entrance examinations: there is no entrance examination for applicants who hold a BS or MS degree from U.S. or Canadian schools. However, international applicants must submit general GRE and

TOEFL scores. The GRE advanced engineering subject test is recommended.

- Prerequisite: BS degree (or equivalent) in chemical engineering from a program accredited by the Accreditation Board for Engineering and Technology (ABET), with a minimum 3.0 GPA in upper-division chemical engineering courses and a minimum 3.3 GPA in all courses.

Requirements for Degree.

- Credit hours: minimum 54 semester hours, at least 36 of which must be course work beyond the baccalaureate degree, plus 18 hours of dissertation (ChEn 799R).

Candidates Without a Master's Degree:

36 hours. At least 6 hours of the 36 must be in advanced mathematics, statistics, or computer science and a minimum 18 hours of dissertation (ChEn 799R).

Candidates with a Master's Degree:

with committee approval, up to 36 hours of previous graduate work, may apply toward the doctorate, but at least 36 hours must be taken at BYU (including 18 dissertation hours). Courses taken in the master's program may apply toward the required 6 hours of advanced mathematics, statistics, or computer science.

- Required courses: ChEn 501, 531, 533, 535, 791R (every semester), 6 hours of advanced mathematics, statistics, or computer science, and 17 hours of elective courses.
- Undergraduate hours: up to 6 hours of 300- and 400-level interdisciplinary courses from an approved list may be applied toward the 36 hours of course work for interdisciplinary research areas, such as biomedicine and statistical mechanics. These approved courses appear in the Chemical Engineering Graduate Handbook.
- Study list: the graduate study list must be submitted during the first semester of doctoral study.
- Residency: see residence requirements listed in the preceding Chemical Engineering—MS section.

- Comprehensive qualifying examination: during the second semester students must take and pass a written comprehensive qualifying examination based on graduate course work. The results of this examination are considered together with other performance criteria in evaluating the student for admission to candidacy.
- Prospectus: each student must submit and successfully defend a written prospectus on his or her proposed dissertation research topic during the second year of study. The quality of the prospectus is considered together with other performance criteria in evaluating the students for admission to candidacy.
- Dissertation.
- Oral defense of dissertation.
- Cumulative GPA: 3.0 or above in all PhD courses.

Integrated Master's Program—BS/MS

Students who desire to obtain a master's degree in engineering, and who have been accepted to a department professional program, may elect to enter the integrated master's program at the end of the sophomore year or during the junior year of the engineering curriculum. The purpose of the program is to afford greater flexibility in scheduling course work than is normally available through a traditional BS degree followed by an MS degree program.

In this program the BS degree may be received before or simultaneously with the MS degree (normally five years from freshman matriculation). Specific requirements are the same as those listed for the chemical engineering MS but include the following:

Admission and Entry.

Application requirements: formal application for admission submitted to the Office of Graduate Studies (B-356 ASB) before completion of final 34 hours of combined graduate and undergraduate course work. Applicants must have a cumulative 3.3 or higher GPA and a 3.0 GPA in all chemical engineering classes.

Requirements for Degree.

- Maintenance requirements: cumulative 3.0 GPA or above in upper-division and graduate chemical engineering courses and satisfactory performance evaluation by the research advisor.
- Degree requirements: same as MS degree including a cumulative 3.0 GPA or above in all master's degree courses and, during first semester of registration as a graduate student, submission of a final study list that specifies all technical elective courses.

FINANCIAL ASSISTANCE

Through support from the Key Industries Program, the university, and faculty research contracts, many scholarships, fellowships, research assistantships, and teaching assistantships are available to chemical engineering students. The department also has a few prestigious fellowships in excess of \$10,000 for qualifying students:

- Dupont/Conoco Incorporated Fellowship.
- Huntsman Chemical Corporation Fellowship.

RESOURCES AND OPPORTUNITIES

The Department of Chemical Engineering utilizes many facilities.

The Advanced Combustion Engineering Research Center (ACERC) is nationally recognized as a leading center for interdisciplinary combustion research. Founded by the National Science Foundation (NSF) as an engineering research center, ACERC has secured significant additional financial support from U.S. corporations. Students and faculty associated with the center pursue experimentation, analysis, computer modeling, and design of combustion systems.

DIPPR Thermophysical Properties Laboratory. Development and management of the DIPPR 801 thermophysical property database is the major pursuit of the DIPPR

laboratory. This database, perhaps the best in the world of its kind, is sponsored by the Design Institute for Physical Property Data (DIPPR) of the American Institute of Chemical Engineers (AIChE). Research activities consist of collecting and evaluating literature data on pure component properties and developing correlation and prediction techniques. Experimental projects also compose a significant emphasis of the laboratory.

Advanced Composites Manufacturing and Engineering Center (ACME). This center was established to promote the use and understanding of advanced materials, largely in support of the existing composite and plastic material companies operating in the state of Utah. ACME has extensive test equipment for determining physical, mechanical, chemical, and in-use properties of composites and plastic materials.

Catalysis Laboratory. The lab has a fourteen-year history of productive research in heterogeneous catalysis. Highly interdisciplinary in nature, this research applies principles of kinetics, chemistry, materials science, surface science, and chemical engineering to the understanding of catalyst properties and catalytic reactions.

All of the faculty actively participate in research endeavors, and a number have gained international recognition for their work. Faculty research is particularly strong in the following areas: biomedical engineering; chemical propulsion; coal combustion and gasification; computer simulation; thermodynamics; kinetics and catalysis; materials; process design and control; statistical mechanics; transport phenomena.

For a more detailed description of the graduate program requirements, send for a copy of the Chemical Engineering Graduate Student Handbook.

COURSE DESCRIPTIONS

500. Creative Skills in Chemical Engineering. (1)

Application of creativity and technical knowledge from prior course work to solution of relevant, open-ended problems.

501. Directed Graduate Studies. (2)

Guided preparation for department's comprehensive exams and for formulation of research prospectus.

510. Principles of Reservoir Engineering. (3)

Prerequisite: ChEn 373.

Reservoir and hydrocarbon classification; fluid flow; primary oil and gas recovery mechanisms; enhanced oil recovery.

511. Environmental Engineering for Chemical Engineers. (3)

Prerequisite: ChEn 273 or equivalent.

Overview of environmental engineering for chemical engineers. Topics include environmental legislation, toxicology, process design for pollution prevention/waste minimization, hazardous waste treatment and disposal, and remediation.

518. Biomedical Engineering Principles. (3)

Prerequisite: ChEn 376, Math 213.

Application of chemical engineering principles to model physiologic systems and to solve medical problems.

528. Industrial Catalytic Processes. (2)

Prerequisite: Chem 106 or 111; Chem 351; ChEn 378; or equivalents. Recommended: ChEn 478.

Fundamentals of catalytic chemistry and materials; applications to important industrial catalytic processes. Includes catalyst materials and preparation, catalyst characterization, fixed-bed reactor design, and catalyst deactivation.

531. Thermodynamics of Multicomponent Systems. (3)

Prerequisite: ChEn 373 or 461.

Fundamental concepts and applications in first and second laws, equilibrium and stability, phase equilibrium, and homogeneous and heterogeneous chemical equilibrium.

533. Transport Phenomena. (3)

Prerequisite: ChEn 476 or concurrent registration. Recommended: Math 323.

Transport mechanisms and coefficients and fundamental field equations for momentum, heat, and mass transport, with application to system design.

534. Advanced Separations. (3)

Prerequisite: ChEn 533, Math 213.

General theory of differential and stagewise diffusional and separation operations, multicomponent distillation, extraction, and absorption; application of this theory to solution of complex problems, including column design and instrumentation.

535. Kinetics and Catalysis. (3)

Prerequisite: ChEn 478.

Theories and principles of chemical kinetics, including heterogeneous catalysis and reactor design.

536. Digital Process Control. (2)

Prerequisite: ChEn 436.

Computer application of advanced control algorithms to chemical processes.

541. Computer Design Methods. (2)

Prerequisite: Math 311, ChEn 376.

Computer-aided design and numerical methods of chemical engineering processes.

578. Polymer Science and Engineering. (3)

Prerequisite: introductory materials engineering course.

Fundamentals of polymer chemistry and physics and their implications in engineering applications. Topics include polymerization chemistry, structure-property relationships, polymer physics, and transport properties.

631. Applied Statistical Mechanics. (3)

Prerequisite: Chem 461; ChEn 531 or equivalent.

Fundamentals of statistical mechanics and their application to calculating thermodynamic and transport properties of fluids and fluid mixtures.

633. Combustion Processes. (3)
Prerequisite: ChEn 533 or equivalent.

Fundamentals of transport processes in reacting flow systems with specific applications of various combustion processes.

641. Combustion Modeling. (3)
Prerequisite: ChEn 633; Math 311 or ChEn 541.

Theory of combustion systems and quantitative procedures for computing performance of combustion chambers. Applications include turbulent combustion of gases, sprays, and particulates.

674. Advanced Thermodynamics. (2)
Prerequisite: ChEn 531 or equivalent.

Advanced topics in thermodynamics, including electrolytes, phase equilibrium modeling, nonequilibrium thermodynamics, and calorimetry.

685. Chemical Engineering for Chemistry Students. (6)

Intensive treatment of fundamentals of material and energy balances, fluid flow, and heat and mass transfer, with application to design and analysis of engineering systems.

691R. Seminar for Master's Students. (0.5)

Technical presentations by graduate students, faculty members, and guests.

693R. Special Topics—Graduate. (1–6)

697R. Special Problems—Graduate. (2–6)

698R. Master's Project. (1–6)

699R. Master's Thesis. (1–6)

733. Coal Combustion. (3)

Prerequisite: instructor's consent.

Fundamentals of coal combustion and gasification processes, including particle mechanics, devolatilization, heterogeneous oxidation, radiative heat transfer, and combustion of coal in practical flames.

791R. Seminar for Doctoral Students. (0.5)

793R. Selected Topics in Chemical Engineering. (1–3)

Topics vary according to student-faculty research interests.

799R. Doctoral Dissertation. (1–9)

FACULTY

BARTHOLOMEW, CALVIN H., Professor.
PhD, Stanford University, 1972.
Catalysis.

BECKSTEAD, MERRILL W., Professor.
PhD, University of Utah, 1965.
Combustion of Solid Propellants.

FLETCHER, THOMAS H., Professor.
PhD, Brigham Young University, 1983. Combustion and Transport Processes in Reacting Flow Systems.

HALES, HUGH B., Research Professor.
PhD, Massachusetts Institute of Technology, 1967. Petroleum Engineering; Reservoir Simulation.

HARB, JOHN N., Associate Professor.
PhD, University of Illinois, 1988.
Electrochemical Engineering; Coal Combustion.

HECKER, WILLIAM C., Associate Professor. PhD, University of California, Berkeley, 1982.
Catalysis; Chemical Kinetics.

HEDMAN, PAUL O'DELL, Professor.
PhD, Brigham Young University, 1973. Combustion/Gasification; Fossil Energy.

OSCARSON, JOHN L., Professor. PhD, University of Michigan, 1985.
Vapor-Liquid Equilibria; Separation Processes.

PITT, WILLIAM G., Professor. PhD, University of Wisconsin, Madison, 1987. Surface Chemistry; Biomedical Polymers.

ROWLEY, RICHARD L., Professor. PhD, Michigan State University, 1978.
Liquid-Mixture Transport Properties; Thermodynamics.

SMOOT, L. DOUGLAS, Professor. PhD, University of Washington, 1960.
Combustion, Coal Gasification.

SOLE, KENNETH A., Professor. PhD, University of Wisconsin, Madison, 1974. Blood-Material Interactions; Blood Filtration.

TERRY, RONALD E., Professor. PhD, Brigham Young University, 1976.
Enhanced Oil Recovery; Thermodynamics.

WILDING, W. VINCENT, Associate Professor. PhD, Rice University, 1985. Applied Thermodynamics.

CHEMISTRY AND BIOCHEMISTRY

Chair: Francis R. Nordmeyer
Graduate Coordinator: Earl M. Woolley

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THE PROGRAM OF STUDIES

Chemistry is fundamental in our physical and biological world. The principles and applications of chemistry are diverse, interesting, and challenging. The graduate program in chemistry and biochemistry at BYU prepares developing scientists to enjoy the excitement of chemistry and to contribute in diverse circumstances where chemical knowledge and skill are needed.

Thirty-six faculty are the foundation of an excellent graduate program. The department recently occupied the new 190,000-square-foot Benson Science Building, which provides comfortable, modern laboratories. Extensive instrumentation is available and constantly being replaced or upgraded to support cutting-edge research.

About seventy graduate students provide an essential and dynamic atmosphere for research progress and stimulating discussion. Twenty postdoctoral students and visiting scientists add depth and diversity to the intellectual atmosphere. About seventy undergraduate research assistants also bring significant strength and enthusiasm to research projects.

Additional information about faculty members and their research interests are found in a color brochure available from the department office at the address, phone number, fax, or e-mail address given above.

The Department of Chemistry and Biochemistry offers four degrees:

Chemistry—MS, Biochemistry—MS, Chemistry—PhD, and Biochemistry—PhD.

Areas of emphasis include: Analytical Chemistry, Biochemistry, Inorganic Chemistry, Organic Chemistry, and Physical Chemistry.

About 80 percent of the graduate students are in the PhD program, and they complete their work in four to five years. MS program students complete their work in one and a half to two and a half years.

Admission and Entry.

- Application materials (for all degree programs): completed Brigham Young University Application for Admission to Graduate Study and official results of the GRE general and the GRE subject chemistry or biochemistry test. Official TOEFL examination results are also required from persons whose first language is not English.
- Semesters of entry and application deadlines: fall, February 1 (U.S. and international); winter, August 15 (U.S. only).
- Prerequisite requirements: applicants should have completed a baccalaureate degree in chemistry or biochemistry or have equivalent preparation in chemistry and biochemistry.
- Entrance examinations: written examinations of a new student's undergraduate preparation in five areas of chemistry are given during the week preceding the first semester of enrollment.

Chemistry—MS

The chemistry MS degree provides specialized study and research on an advanced level. It includes about one year of course work beyond the bachelor's degree and the development of a significant research project presented in a thesis. The MS student will study in one of the four chemistry areas of emphasis or develop, with an advisor, an interdisciplinary program. The added preparation in theory and practice allows the chemical scientist to assume responsibility and supervi-

sion beyond that normally given with bachelor's level study. The MS degree is adequate preparation for some junior college teaching positions. The master's degree is generally not necessary as a preparatory step for the PhD degree.

Requirements for Degree.

- Credit hours (30): 24 hours of course work and research plus 6 thesis hours (Chem 699R).
- Required courses: Chem 594R (every semester in residence) and other courses as specified by committee.
- Annual progress review and/or examination.
- Thesis.
- Final oral examination consisting of two parts: (A) public presentation of original research described in thesis; (B) comprehensive examination on course work, research, and thesis.

Biochemistry—MS

The biochemistry MS degree provides specialized study on an advanced level. The degree includes about one year of course work beyond the BS degree and a thesis based upon a significant research project. The research will be in areas of biochemical emphasis, such as molecular genetics, enzymology, or protein structure and function. The added preparation in theory and practice allows the MS biochemist to assume responsibility and supervision beyond that normally given a BS or BA biochemist. The MS degree is adequate preparation for some junior college teaching positions. It is generally not a prerequisite for a PhD degree program.

Requirements for Degree.

- Credit hours (30): 24 hours of course work and research plus 6 thesis hours (Chem 699R).
- Required courses: Chem 582, 584, 594R (every semester in residence), and other courses as specified by committee.
- Annual progress review and/or examination.
- Thesis.

- Final oral examination consisting of two parts: (A) public presentation of original research described in thesis; (B) comprehensive examination on course work, research, and thesis.

Chemistry—PhD

The chemistry PhD degree prepares a scientist to contribute on the creative front of chemical science. A student's study may fall within one of the chemistry areas of emphasis or it may involve an interdisciplinary focus. Some courses on advanced topics related to the student's professional goals will be taken, but the PhD degree is primarily a research experience that is to be reported in a dissertation and in the scientific literature. The PhD chemist is prepared for a wide range of career choices and will be expected to act with considerable independence and enjoy major responsibilities. A new PhD chemist may seek employment in industry, government agencies, or the university or college setting.

Requirements for Degree.

- Credit hours (54): 36 hours of course work and research plus 18 dissertation hours (Chem 799R). (With departmental approval, some credit from an MS degree may be applied toward this requirement.)
- Required courses: Chem 594R (every semester in residence) and other courses as specified by committee.
- Annual progress review and/or examination.
- Comprehensive qualifying exam: written and/or oral.
- Dissertation.
- Final oral examination consisting of two parts: (A) public presentation of original research described in dissertation; (B) oral examination, primarily on dissertation.

Biochemistry—PhD

The biochemistry PhD degree prepares a scientist to perform and to supervise creative research in biochemistry and molecular biology. The PhD degree requires some

course work, but the emphasis is primarily on original, creative research leading to a dissertation and to publications in scientific journals. The PhD biochemist is prepared for a wide range of career opportunities that involve independent thinking and supervisory responsibilities in industry, government, or academia.

Requirements for Degree.

- Credit hours (54): 36 hours of course work and research plus 18 dissertation hours (Chem 799R). (With departmental approval, some credit from an MS degree may be applied toward this requirement.)
- Required courses: Chem 582, 584, 594R, (every semester in residence), and other courses as specified by committee.
- Annual progress review and/or examination.
- Comprehensive qualifying exam: written and/or oral.
- Dissertation.
- Final oral examination consisting of two parts: (A) public presentation of original research described in dissertation; (B) oral examination, primarily on dissertation.

FINANCIAL ASSISTANCE

All eligible students in the department's graduate program who request financial aid are granted tuition for all required graduate courses and a graduate assistantship. These awards are granted on a continuing basis as long as satisfactory progress is being made toward the degree. This financial assistance allows students to be involved full-time in their graduate program, which will include research and course work and may also include teaching and laboratory assistant assignments.

Other types of financial aid such as internships, scholarships, and student loans may also be available to students who qualify. More information may be obtained from the department office and from the Financial Aid Office.

The department relies on its graduate students to fill many assignments in laboratory and recitation instruction. Unless excused by the faculty, a graduate student is expected to be a teaching assistant for at least two semesters for twenty hours a week during residency toward the doctoral degree. Master's degree candidates are expected to teach half this amount.

RESOURCES AND OPPORTUNITIES

State Centers of Excellence. The state of Utah has established and funded a number of research and development Centers of Excellence. These centers promote joint efforts between the university and industry in the development of new technologies. The Department of Chemistry and Biochemistry houses two of these centers, one for chemical separations and the other for supercritical fluid separation technologies.

Advanced Supercritical Fluid Separation Technologies Center of Excellence. The center is developing and testing instrumentation for the use of supercritical fluids in analytical chemistry applications. Capillary supercritical fluid chromatography was first successfully demonstrated at BYU. Researchers are pursuing improvements to ensure reliability, instrument simplicity, and improved methods of sample introduction, separation, and detection. The center has recently extended research into new analytical detection techniques, including radiofrequency plasma emission spectrometry and time-of-flight mass spectrometry.

Chemical Separations Center of Excellence. The chemical separations group is engaged in designing and building chemical separations systems that can selectively bind specific chemical structures with certain ions or molecules. The group hopes, among other things, to find ways to separate enantiomeric forms of chemical compounds and trace metals from solutions.

Cancer Research Center. The objective of the BYU Cancer Research Center is to make significant scientific contributions toward the control and cure of cancer. Intense investigations of oncogenes and their relation to the development of cancer represents a major activity within the center. Faculty and students from the Department of Chemistry and Biochemistry and from the College of Biology and Agriculture contribute their expertise.

Center for Thermodynamics. The center involves chemical thermodynamics research in the Departments of Chemistry and Biochemistry and Chemical Engineering and also involves faculty and students in other areas such as physics, engineering, biology, and agricultural sciences. The center facilitates the exchange of ideas and information and coordinates the use of sophisticated instruments used to make thermodynamic measurements. Calorimetry is an especially strong part of this program, which also includes research in phase equilibria, solution thermodynamics, and electrochemistry. Eighteen faculty and other full-time personnel are formally affiliated with the center and are involved in thermodynamic research.

ADDITIONAL INFORMATION

A color brochure entitled "Graduate Studies in Chemistry and Biochemistry" includes more detailed information about the research programs and interests of each faculty member. This publication also includes a short summary of research instruments and facilities available to graduate students. The department office will provide this brochure and additional information about admission to the graduate program and the work of graduate students as students progress toward an advanced degree. We invite you to contact us by letter, fax, or e-mail. (Please see preceding address information.)

COURSE DESCRIPTIONS

501. Chemical Handling and Safe Laboratory Practices. (0.5)

Survey of appropriate methods to handle hazardous materials and dispose of waste. Legal rights and requirements. Safety in chemistry laboratory work.

514. Inorganic Chemistry. (3)

Prerequisite: Chem 461, 462; or 461, 468.

In-depth treatment of theoretical concepts in inorganic chemistry and the descriptive chemistry of some of the elements.

518. Inorganic Synthesis. (2)

Prerequisite: Chem 501 or concurrent registration; Chem 514.

Syntheses that demonstrate a variety of techniques and a range of inorganic materials.

521. Instrumental Analysis**Lecture.** (2)

Prerequisite: Chem 464 or equivalent; Chem 501 or concurrent registration.

Modern instrumental methods and basic principles of instrumentation.

523. Instrumental Analysis Laboratory. (2)

Prerequisite: Chem 464 or equivalent; Chem 501 or concurrent registration.

Continuation of Chem 521. Laboratory experience with modern analytical instrumentation.

552. Advanced Organic Chemistry. (3)

Prerequisite: Chem 351, 352; 461, 462.

Emphasizes physical aspects of organic chemistry; mechanisms, reaction intermediates, bonding, stereochemical and stereoelectronic effects, molecular orbital theory, Lewis acidity and basicity.

553. Advanced Organic Chemistry. (3)

Prerequisite: Chem 351, 352.

Synthetic aspects of organic chemistry; oxidations, reductions, concerted reactions, stereoselectivity, synthetic equivalents, protecting groups. Examples of natural product total synthesis.

561. Chemical Thermodynamics. (3)

Prerequisite: Chem 461, 462.

Development of the principles of chemical thermodynamics, including laws, pure materials, mixtures, equilibria, and elementary statistical mechanics.

563. Reaction Kinetics. (3)

Prerequisite: Chem 461, 462.

Theoretical aspects of chemical kinetics in the gas phase and in solution. Rates and mechanisms in solution, rapid reactions, and other topics.

564. Nuclear Chemistry and Radiochemistry. (2–3)

Prerequisite: Chem 461, 462.

Introduction to nuclear structure, radioactivity, nuclear spectroscopy, and nuclear reactions, emphasizing applications in chemistry.

565. Introduction to Quantum Chemistry. (3)

Prerequisite: Chem 461, 462.

Introduction to physical and mathematical aspects of quantum theory, emphasizing application of the Schrödinger wave equation to chemical systems.

569. Fundamentals of Spectroscopy. (3)

Prerequisite: Chem 461, 462; or 461, 468; 523 or equivalent).

Atomic and molecular spectroscopy and application of group theoretical concepts. Types of experiments and interpretation of data.

582. Biochemistry of Nucleic Acids. (3)

Prerequisite: Chem 481 or equivalent.

Second-semester biochemistry. Nucleic acid biochemistry and molecular biology: nucleotide metabolism, chromosome and chromatin structure, DNA structure and replication, RNA transcription and gene expression, protein synthesis and regulation, eukaryotic gene systems.

584. Biochemistry Laboratory. (2)

Prerequisite: Chem 481 or equivalent.

Introduction to current biochemical research procedures including spectrophotometry, chromatography, electrophoresis, and immunochemical techniques. Protein over-expression, isolation and characterization methods. Enzyme kinetics and protein-ligand interactions.

586. Nucleic Acids Laboratory. (2)

Prerequisite: Chem 481 or equivalent.

Laboratory course covering major techniques involved in isolation, amplification, and cloning of recombinant DNA, as well as isolation, synthesis, translation, and identification of RNA.

594R. General Seminar. (0.5)

Research topics presented by faculty and visiting scientists. Required every semester in residence.

596R. Special Topics in Chemistry. (1–3)

Prerequisite: Chem 351, 352; 367 or 461.

Subjects that may be offered include:

- Atmospheric Chemistry
- Ion Chromatography
- Organic Spectroscopic Identification

619R. Advanced Topics in Inorganic Chemistry. (1–3)

Prerequisite: Chem 514 or equivalent.

The following topics are rotated:

- Chemistry of the Main Group Elements.
- Chemistry of the Transition Elements.

629R. Advanced Topics in

Analytical Chemistry. (1-3)

Prerequisite: Chem 523 or equivalent.

The following topics are rotated:

- Separation Methods of Analysis.
- Spectroscopic Methods of Analysis.

659R. Advanced Topics in Organic Chemistry. (1-3)

Prerequisite: Chem 552 or equivalent.

The following topics are rotated:

- Organic Heterocyclic Compounds.
- Organometallic Chemistry.
- Organic Photochemistry.

669R. Advanced Topics in Physical Chemistry. (2-3)

Prerequisite: Chem 561 and/or 565 or equivalent.

The following topics are rotated:

- Advanced Chemical Thermodynamics.
- Quantum Chemistry.

689R. Advanced Topics in Biochemistry. (1-3)

Prerequisite: Chem 582 or equivalent.

The following topics are rotated:

- Biomembranes and Bioenergetics.
- Metabolic Integration.
- Proteins and Enzymes.

697R. Master's Candidate Research. (1-6)

Prerequisite: Chem 501 or concurrent registration.

699R. Master's Thesis. (1-9)

719R. Selected Topics in Inorganic Chemistry. (1-3)

Subjects that may be offered include:

- Bioinorganic Chemistry
- Coordination Chemistry
- Environmental Chemistry

729R. Selected Topics in Analytical Chemistry. (1-3)

Subjects that may be offered include:

- Atomic Spectroscopy
- Chromatography
- Electrochemical Methods of

Analysis

- Molecular Spectroscopy
- X-Ray Structure Analysis

759R. Selected Topics in Organic Chemistry. (1-3)

Subjects that may be offered include:

- Medicinal Chemistry
- Natural Products
- Nucleoside and Nucleotide Chemistry
- Stereoselective Synthesis

769R. Selected Topics in Physical Chemistry. (1-3)

Subjects that may be offered include:

- Advanced Group Theory
- Advanced Techniques in Magnetic Resonance
- Calorimetry
- Molecular Structure and Spectroscopy
- Solid-State Chemistry
- Statistical Mechanics

789R. Selected Topics in Biochemistry. (1-3)

Subjects that may be offered include:

- Biochemistry of Retroviruses
- Biologically Active Peptides
- Biopolymer Conformational Analysis
- Gene Expression in Higher Plants
- Metabolism
- Molecular Biology of Cancer
- Transmembrane Signalling

797R. Doctoral Candidate Research. (1-9)

Prerequisite: Chem 501 or concurrent registration.

799R. Doctoral Dissertation. (1-9)

FACULTY

ANDRUS, MERRITT B., *Assistant Professor.* PhD, University of Utah, 1991. Organic Chemistry.

BORGES, DAVID A., *Associate Professor.* PhD, Indiana University, 1967. Biochemistry; Organic Chemistry.

BILLS, JAMES L., *Professor.* PhD, Massachusetts Institute of Technology, 1963. Inorganic Chemistry.

BOERIO-GOATES, JULIANA, *Professor.* PhD, University of Michigan, 1979. Physical Chemistry.

BRADSHAW, JERALD S., *Professor.* PhD, University of California, Los Angeles, 1963. Organic Chemistry.

DALLEY, N. KENT, *Professor.* PhD, University of Texas, Austin, 1968. Analytical Chemistry.

DEARDEN, DAVID V., *Associate Professor.* PhD, California Institute of Technology, 1989. Analytical/Physical Chemistry.

EATOUGH, DELBERT J., *Professor.* PhD, Brigham Young University, 1967. Physical and Atmospheric Chemistry.

ELTON, TERRY S., *Associate Professor.* PhD, Washington State University, 1986. Biochemistry.

FARNSWORTH, PAUL B., *Professor.* PhD, University of Wisconsin, Madison, 1981. Analytical Chemistry.

FLEMING, STEVEN A., *Associate Professor.* PhD, University of Wisconsin, Madison, 1984. Organic Chemistry.

GOATES, STEVEN R., *Professor.* PhD, University of Michigan, 1981. Analytical Chemistry.

GRANT, DAVID M., *Professor.* PhD, University of Utah, 1958. Physical Chemistry.

GRAVES, STEVEN W., *Associate Professor.* PhD, Yale University, 1978. Biochemistry.

HANSEN, LEE D., *Professor.* PhD, Brigham Young University, 1965. Inorganic Chemistry.

HARRISON, ROGER G., *Assistant Professor.* PhD, University of Utah, 1993. Inorganic Chemistry.

KASPAR, ROGER L., *Assistant Professor.* PhD, University of Washington, 1991. Biochemistry.

KUCHAR, MARVIN C. J., *Associate Professor.* PhD, Brigham Young University, 1963. Organic Chemistry.

LAMB, JOHN D., *Professor.* PhD, Brigham Young University, 1978. Inorganic Chemistry.

LEE, MILTON L., *Professor.* PhD, Indiana University, 1975. Analytical Chemistry.

MANGELSON, NOLAN F., *Professor*. PhD, University of California, Berkeley, 1967. Physical Chemistry.

NORDMEYER, FRANCIS R., *Professor*. PhD, Stanford University, 1967. Inorganic Chemistry.

OTT, J. BEVAN, *Professor*. PhD, University of California, Berkeley, 1959. Physical Chemistry.

OWEN, NOEL L., *Professor*. PhD, Cambridge University, 1964; DSc, University of Wales, 1983. Physical Chemistry.

PETERSON, MATT A., *Assistant Professor*. PhD, University of Arizona, 1992. Organic Chemistry.

PUGMIRE, RONALD J., *Professor*. PhD, University of Utah, 1966. Physical Chemistry.

ROBINS, MORRIS J., *Professor*. PhD, Arizona State University, 1965. Organic Chemistry.

SAVAGE, PAUL B., *Assistant Professor*. PhD, University of Wisconsin, 1993. Organic Chemistry.

SHIRTS, RANDALL B., *Associate Professor*. PhD, Harvard University, 1979. Physical Chemistry.

SIMMONS, DANIEL L., *Associate Professor*. PhD, University of Wisconsin, Madison, 1986. Biochemistry.

THORNE, JAMES M., *Professor*. PhD, University of California, Berkeley, 1966. Physical Chemistry.

WATT, GERALD D., *Professor*. PhD, Brigham Young University, 1966. Inorganic Chemistry.

WILLARDSON, BARRY M., *Assistant Professor*. PhD, Purdue University, 1990. Biochemistry.

WOODFIELD, BRIAN F., *Assistant Professor*. PhD, University of California, Berkeley, 1994. Physical Chemistry.

WOOLLEY, EARL M., *Professor*. PhD, Brigham Young University, 1969. Analytical/Physical Chemistry.

ZIMMERMAN, S. SCOTT, *Professor*. PhD, Florida State University, 1973. Biochemistry.

CIVIL AND ENVIRONMENTAL ENGINEERING

Chair: T. Leslie Youd

Graduate Coordinator: A. Woodruff Miller

368 CB

Provo, UT 84602-4081

(801) 378-2811

THE PROGRAM OF STUDIES

Two degrees are offered through the Department of Civil and Environmental Engineering: Civil Engineering—MS and Civil Engineering—PhD. The department also offers an integrated BS/MS program.

The Department of Civil and Environmental Engineering admits approximately seventy-five students each year into its programs.

Civil Engineering—MS

The MS degree is awarded to students who have mastered professional training in selected areas of civil and environmental engineering. Such training is gained through graduate course work which, unlike bachelor's course work, consists of elective courses and directed research or design.

Students pursuing the thesis option gain the added dimension of participating in research work (usually funded) at the cutting-edge of the profession. This research work culminates in a high-quality thesis presentation. Alternatively, the student may choose the project option and complete a less intensive research or design study. The degree normally requires one year beyond the bachelor's degree.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and May 15 (U.S.); winter, June 30 (international) and September 15 (U.S.); spring, October 31 (international) and

February 15 (U.S.); summer, December 31 (international) and March 15 (U.S.).

- Application requirements: there is no entrance examination for applicants who hold a BS from U.S. or Canadian schools. However, international students must submit scores for the GRE general test, advanced engineering subject test, and TOEFL (575 minimum). Prerequisite: baccalaureate degree in civil engineering or its equivalent. Students with other backgrounds will also be considered.

Requirements for Degree.

- Credit hours:
Thesis Program: 30 minimum approved hours including 6 thesis hours (CEEn 699R).
Project Program: 30 minimum approved hours including a maximum of 3 project hours.
- Required course: CEEn 691R (Graduate Seminar) each fall and winter semester; no more than 1 hour can count toward the minimum hours required. Consult department for details.
- Study list: the graduate study list must be submitted during the first semester of graduate study.
- Residency requirements: residency is required for the major part of the work toward the master of science degree. This work must be completed under the specific direction of a graduate faculty member while the student is in residence at BYU (at least two consecutive full-time semesters). "In residence" is defined as (1) being registered for credit as a graduate student and (2) living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty. Further, all work applying toward any master's project or thesis must be completely open for university review and publication. Any exceptions to the above must be supported by written approval from the department and college and obtained in advance of any work being performed.

- Examinations: (A) successful completion of the fundamentals of engineering examination (FE); (B) oral defense of thesis or oral presentation of project.
- Cumulative 3.0 GPA or above in all master's degree courses.

Engineering Management—Minor

Offered to MS students in the College of Engineering and Technology, the engineering management minor provides a way to include some elements of modern management in a technical graduate program.

Requirements.

- The minor requires 9 hours selected from the following courses: Mgt 501, 511, 541, 561, 562, 580, 565, or approved Marriott School graduate courses.
- Students should carefully plan how they will meet the requirements of the minor since these courses are taught only once a year.

This minor should be declared as part of a student's graduate study list. Admittance approval to enroll in class will be derived from approved graduate study lists.

Civil Engineering—PhD

The PhD is awarded to candidates who have made a significant contribution to knowledge in a particular specialization of civil and environmental engineering. Such a contribution is achieved through research that involves a thorough review of applicable literature, completion of carefully planned work, and a high-quality presentation of the new knowledge: the dissertation. Adequate course work is necessary to provide a foundation of expertise for quality research. The degree normally requires three years beyond the bachelor's degree or two years beyond the master's degree.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and May 15 (U.S.); win-

ter, June 30 (international) and September 15 (U.S.); spring, October 31 (international) and February 20 (U.S.); summer, December 31 (international) and April 15 (U.S.)

- Application requirements: there is no entrance examination for applicants who hold a BS or MS degree from U.S. or Canadian schools. However, international students must submit scores for the GRE general test, advanced engineering subject test, and TOEFL (575 minimum).
- Prerequisite: BS degree (or equivalent) in civil engineering from a program accredited by the Accreditation Board for Engineering and Technology (ABET) with a minimum 3.4 GPA in the last 60 hours of technical and scientific course work. A BS in any other field requires provisional admission. Consult the department for specific details.

Requirements for Degree.

- Credit hours: minimum 54 semester hours, at least 36 of which must be course work beyond the baccalaureate degree, plus a minimum 18 hours of dissertation (CEEn 799R).

Candidates Without a Master's Degree: at least 54 semester hours with a minimum 36 hours in graduate-level courses, plus a minimum 18 hours of dissertation (CEEn 799R). Students with no advanced mathematics, statistics, or science in their baccalaureate degree will be required to take additional courses in these areas.

Candidates with a Master's Degree: at least 36 semester hours beyond master's degree hours with a minimum 18 hours in graduate-level courses, plus a minimum 18 hours of dissertation (CEEn 799R).

Students with no advanced mathematics, statistics, or science in their baccalaureate or master's degree will be required to take additional courses in these areas.

- Required course: CEEEn 691R (graduate seminar) each fall and winter semester; no more than 2

hours can count toward minimum hours required.

- Study list: the graduate study list must be submitted during the first semester of doctoral study.
- Residency requirements: see residency requirements listed in the preceding Civil and Environmental Engineering—MS section.
- Comprehensive qualifying examination: students must take and pass a written comprehensive qualifying examination based on graduate course work. After passing this examination, the student is accepted to candidacy for the doctoral degree. The examination is offered twice a year and is generally taken at the end of the first two semesters of the graduate program.
- Prospectus: students must submit and successfully defend a written prospectus on their proposed dissertation research topic at least one year before completion of the degree.
- Dissertation.
- Oral defense of dissertation.

Integrated Master's Program—BS/MS

Students who desire to obtain a master's degree in engineering, and who have been accepted to the department professional program, may elect to enter the integrated master's program during the junior year of the engineering curriculum. The purpose of the program is to afford greater flexibility in scheduling course work than is normally available through a traditional BS degree followed by an MS degree program.

In this program the BS degree will be received simultaneously with the MS degree (normally five years from freshman matriculation). Specific requirements are the same as those listed for the civil and environmental engineering MS but include the following:

Admission and Entry.

- Submit formal graduate program application for admission to the Office of Graduate Studies before completion of final 30 hours of graduate degree.

- Required GPA: cumulative of 2.5 or better in civil and environmental engineering courses at end of sophomore year.

Requirements for Degree.

- Submit final study list during first semester of registration as a graduate student.
- Cumulative 3.0 GPA or above in all master's degree courses.

FINANCIAL ASSISTANCE

Departmental Scholarships.

Master's or PhD candidates are eligible for scholarships each year.

Applications may be obtained in March from the department office; the awards are given in mid-April for the next fall. Selection is based on need and on scholastic merit (primarily using the GPA of the last 60 hours on a verified transcript). These scholarships may be received in addition to any assistantships or privately endowed awards unless the total financial aid package exceeds the scholarship limit stipulated by the university.

Research Assistantships. Most of the faculty obtain funds from both off-campus and on-campus sources to support research assistants. These awards support students at the current pay rate for up to 20 hours per week. The research work normally applies toward completion of the student's thesis or dissertation.

Teaching Assistantships. All graduate students are eligible to be TAs. The assistantships are usually for 10 hours per week and consist of teaching and grading courses. Graduate applicants are given priority over undergraduates.

Privately Endowed Awards. The department currently has access to the Caleb Tanner Scholarship for a student pursuing graduate work in water resources engineering. This is a cash award of \$2,000 to \$3,000 for one year. Applications are available in March.

Resources and Opportunities

The College of Engineering and Technology, of which the Department of Civil and Environmental Engineering is a part, has experienced rapid growth in funded research during the past decade. A national leader in several areas, the college's research organizations now have two centers: the Advanced Combustion Engineering Research Center (ACERC) and the Advanced Composites Manufacturing and Engineering Center (ACME). This includes one of the prestigious National Science Foundation engineering research centers, four research laboratories, and two state-funded Centers of Excellence. More than half the faculty participate in research endeavors, and a number have gained international recognition for their work. Listed below are the resources most pertinent to the Department of Civil and Environmental Engineering:

Environmental Modeling Research Laboratory (EMRL). This laboratory is organized within the Civil and Environmental Engineering Department. During the last few years, the emphasis of the laboratory has been on applications in geotechnical and hydrological engineering. There are over 3,000 users of the current software products located in 60 nations. Software development is funded from software license fees and direct participation by governmental agencies and private industry.

Research and development activities of the laboratory are supervised by three faculty members. They are assisted in their work by undergraduate and graduate students. Numerous student research and development projects are sponsored within EMRL.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500. (CEEn-MeEn) Design and Materials Applications. (3)

Prerequisite: CEEn 203; MeEn 372 or CEEn 321

Applied and residual stress; materials selection; static, impact, and fatigue strength; fatigue damage; surface treatments; elastic deflection and stability—all as applied to mechanical design.

501. (CEEn-MeEn) Stress Analysis and Design of Mechanical Structures. (3)

Prerequisite: CEEn 321 or MeEn 372.

Stress analysis and deflection of structures; general bending and torsion with computer applications to mechanical and aerospace structure design.

502. (CEEn-MeEn) Composite and Smart Structures. (3)

Prerequisite: Math 213; CEEn 321 or MeEn 372; or equivalent.

Analysis of advanced composite structures; classical and energy approaches; design considerations; introduction to smart structures concepts.

503. (CEEn-MeEn) Theory of Elasticity. (3)

Prerequisite: CEEn 203, Math 321.

Tensor notation, stress and deformation tensors, constitutive equations, field equations; plane stress/plane strain, axisymmetric, thermoelasticity, and large deformation problems.

505. Materials, Uses, and Properties of Concrete. (3)

Prerequisite: instructor's consent.

Manufacturing and testing of cements; concrete materials and concrete mix design; techniques of concrete handling, placing, and treatment, including laboratory work.

506. (CEEn-MeEn) Continuum Mechanics and Finite Element Analysis. (3)

Prerequisite: Math 213; CEEEn 321 or MeEn 372; or equivalent.

Equilibrium and constitutive equations; closed-form elasticity solutions; beam and plate theory; finite element methodology; membrane, axisymmetric, beam, plate, shell, and solid elements. Application to heat transfer, flow-through porous media, and other problems.

507. (CEEn-MeEn) Finite Element Programming. (3)

Prerequisite: CEEEn 321 or MeEn 372 or equivalent.

Developing a general-purpose computer program for analyzing trusses/frames. Developing a general finite element program.

508. (CEEn-MeEn) Dynamics and Stability of Structures. (3)

Prerequisite: Math 213; CEEEn 321 or MeEn 372; or equivalent.

Dynamic analysis of single degree-of-freedom, discrete multi-degree-of-freedom, and continuous systems. Static and dynamic stability of structures.

514. Engineering Applications of GIS. (3)

Prerequisite: senior or graduate status.

Introduction to GIS concepts. Data acquisition and database formulation, including use of GPS. GIS uses in civil engineering.

522 Structural Steel Design. (3)

Prerequisite: CEEEn 205, 321, or equivalent.

Compression and tension of steel members, beams, and beam-columns. Elastic and inelastic lateral-torsional buckling. Structural fasteners.

523. (CEEn-MeEn) Design of Aircraft Structures. (3)

Prerequisite: CEEEn 321 or MeEn 372 or equivalent.

Requirements, objectives, loads, materials, and tools for design of airframe structures; static behavior of thin-wall structures; durability and damage tolerance; certification and testing. Airframe component team design project.

524. Design of Bridge Structures. (3)

Prerequisite: CEEEn 424, 522.

Design of bridge composite; continuous beam and girder bridges including piers, abutments, floor systems, and bearings; field trips to observe bridge construction and fabrication.

526. Prestressed Concrete. (3)

Prerequisite: CEEEn 424 or equivalent.

Basic theory, methods of pre- and post-tensioning, and details of design and fabrication applications to continuous structures.

529. Timber Design. (3)

Prerequisite: CEEEn 321.

Timber species, composition, and grades; design of beams, straight and tapered glue-lam girders, columns, connections, trusses, shear walls, and structural systems.

531. Water Resources Engineering. (3)

Prerequisite: CEEEn 431, 433.

Advanced hydrologic and hydraulic principles in planning and designing irrigation, drainage, flood control, and other water resource facilities.

535. Hydraulic Design of Channels and Control Structures. (3)

Prerequisite: CEEEn 431, 433.

Design of water conveyance channels and control structures, including siphons, chutes, weirs, flumes, dams, spillways, and outlet works.

540. Geo-Environmental Engineering. (3)

Prerequisite: CEEEn 341.

Geotechnical aspects of environmental engineering. Topics include municipal and hazardous solid waste landfill design, and characterization and remediation techniques for contaminated soil and groundwater.

542. Foundation Engineering. (3)

Prerequisite: CEEEn 341 or equivalent.

Soil investigation, bearing capacity and settlement, design of spread footings, combined footings, mat foundations, retaining walls, pile foundations, and drilled shafts.

543. Earth- and Rock-Fill Structures. (3)

Prerequisite: CEEEn 341 or equivalent.

Design and construction of earth- and rock-fill dams, including selecting dam sites and materials, and applying seepage and pore pressure studies, shearing strength data, stability analysis, and construction controls.

545. Geotechnical Analysis of Earthquake Phenomena. (3)

Prerequisite: CEEEn 321, 341.

Earthquake magnitude and intensity potential; design ground motions, elementary dynamics of structures; response spectra; building code provisions; liquefaction and ground failure.

550. Water Quality Management. (3)

Prerequisite: CEEEn 351.

Philosophies, objectives, and methods of water quality management, including impact of various uses on water quality and behavior of pollutants in receiving waters.

555. Sanitary Engineering Analysis. (3)

Prerequisite: CEEEn 351.

Techniques for chemical and biological analysis of major organic and inorganic constituents of water, sewage, and industrial wastes.

561. Geometric Design of Highways. (3)

Prerequisite: CEEEn 361.

Designing visual aspects of highways; highway classification, design controls and criteria, and design elements; vertical and horizontal alignment, cross sections, intersections, and interchanges; capacity analysis.

562. Characteristics and Operations of Traffic Engineering. (3)

Prerequisite: CEEEn 361 or equivalent.

Traffic flow theory, operations and characteristics, including drivers and vehicles, parking facilities, at-grade intersections, channelization, traffic control devices, signals.

563. Pavement Design. (3)

Prerequisite: CEEEn 361.

Properties and selection of pavement components, including soils, stabilized soil, base, subbase, subgrade, and bituminous materials, along with design of rigid and flexible pavements.

565. Transportation in Urban Planning. (3)

Prerequisite: instructor's consent.

Street classification and function; design elements of streets, intersections, and access drives; transportation planning studies; land use transportation interrelationships and improvement alternatives.

570. (CEEEn-MeEn) Computer-Aided Engineering Software Development. (3)

Prerequisite: MeEn 273 or C programming.

Programming methods for the development of engineering software. Data structures, architecture, libraries, and graphical user interfaces, with applications to CAD systems.

571. Engineering Computer Graphics and Software Design. (3)

Prerequisite: FORTRAN, C, or similar computer language background.

Application of modern computer graphics techniques to engineering problems: 2-D and 3-D transformations, perspective, hidden-surface removal, lighting, and shading. Graphics data structures, standards, and device independency. Software design methodology. Term project required.

572. (CEEEn-MeEn-CS 557) Computer-Aided Geometric Design. (3)

Prerequisite: C or similar computer language background.

Mathematical theory of free-form curves and surfaces and solid geometric modeling. Bezier and B-spline curve and surface theory, parametric and implicit forms, intersection algorithms, topics in computer algebra, free-form deformation. Several programming projects required.

575. (CEEEn-MeEn) Optimization Techniques in Engineering. (3)

Prerequisite: Math 213 and FORTRAN, C, or similar computer language background.

Application of computer optimization techniques to constrained engineering design. Theory and use of state-of-the-art computer routines. Robust design methods.

580. Hazardous Waste Management and Control. (3)

Prerequisite: CEEEn 351 or instructor's consent.

Hazardous waste statutes and regulations; introduction to hazardous waste treatment, storage, disposal, and monitoring techniques.

594R. Selected Problems in Civil and Environmental Engineering. (1-3)**609. (CEEEn-MeEn) Spectral Analysis of Dynamic Systems. (3)**

Prerequisite: Math 213 or equivalent.

Digital signal processing and analysis applied to computer-aided testing, system identification, and characterization of random processes. Applications include vibration and acoustic testing, seismic recording and analysis, and system identification for control.

621. Design of Thin Shell Structures. (3)

Prerequisite: CEEEn 424 or equivalent.

Analysis of domes and cylindrical, folded plate, and hypar shells and the design of typical structures of reinforced concrete.

625. Design of Multistory Structures. (3)

Prerequisite: CEEEn 424, 522, or instructor's consent.

Design of shear walls, floors, columns, frames, and foundations, using elastic and plastic methods, including frame response to lateral forces.

641. Advanced Soil Mechanics. (3)

Prerequisite: CEEEn 341 or equivalent.

Advanced discussion and analysis of shear strength of soils, stress distribution in soils, and slope stability analysis.

644. Advanced Foundation Engineering. (3)

Prerequisite: CEEEn 341 or equivalent.

Lateral pressures and earth retaining system, axial and lateral capacities of piles and drilled shafts, foundations subjected to vibratory loadings, foundations on collapsible and expansive soils, soil improvement techniques.

645. Field and Laboratory Testing of Soils. (3)

Prerequisite: CEEEn 341, 542.

Field and laboratory testing procedures used in geotechnical engineering practice: penetration, consolidation, permeability, and shear strength.

647. Seepage and Groundwater Modeling. (3)

Prerequisite: CEEEn 341, 431; or equivalents.

Techniques for modeling groundwater flow on a regional and local basis. Seepage analysis of levees, excavations, and earth dams.

650. Water Treatment Facilities Design. (3)

Prerequisite: CEEEn 351.

Evaluation, selection, and design of water treatment facilities.

651. Wastewater Treatment Facilities Design. (3)

Prerequisite: CEEEn 351.

Evaluation, selection, and design of wastewater treatment facilities.

654. Industrial Waste Treatment. (3)

Prerequisite: CEEEn 650 or 651 (may be concurrent).

Treatment and disposal of industrial wastes; basic industries and their waste problems.

662. Traffic Simulation and Analysis. (3)

Prerequisite: CEEEn 562 or instructor's consent.

Simulating and analyzing highway capacity, traffic flow, and traffic control problems; potential solutions using computer models.

691R. Civil and Environmental Engineering Seminar. (0.5)

694R. Selected Problems in Civil and Environmental Engineering. (1-3)

698R. Master's Project. (1-3)

Prerequisite: graduate committee's consent.

699R. Master's Thesis. (1-9)

Prerequisite: graduate committee's consent.

794R. Selected Topics in Civil and Environmental Engineering. (1-3)

797R. Research for Doctoral Students. (1-9)

799R. Doctoral Dissertation. (1-9)

Prerequisite: graduate committee's consent.

FACULTY

BALLING, RICHARD J., Professor. PhD, University of California, Berkeley, 1982. Structural Mechanics.

BENZLEY, STEVEN E., Professor. PhD, University of California, Davis, 1971. Structural Mechanics.

BORUP, M. BRETT, Associate Professor. PhD, Clemson University, 1985. Environmental Engineering.

BUDGE, W. DON, Professor. PhD, University of Colorado, 1964. Transportation; Materials.

CHRISTIANSEN, HENRY N., Professor. PhD, Stanford University, 1962. Structural Mechanics; Computer Graphics.

DOWNES, WAYNE, Associate Professor. PhD, University of Florida, 1993. Environmental Engineering.

FONSECA, FERNANDO S., Assistant Professor. PhD, University of Illinois, 1996. Structures.

GOODWIN, REESE J., Associate Professor. PhD, University of Utah, 1976. Structures.

JENSEN, DAVID W., Associate Professor. PhD, Massachusetts Institute of Technology, 1986. Structures; Advanced Composites.

JONES, NORMAN L., Associate Professor. PhD, University of Texas, Austin, 1990. Geotechnical Engineering.

MERRITT, LAVERE B., Professor. PhD, University of Washington, 1970. Environmental and Water Resources.

MILLER, A. WOODRUFF, Professor. PhD, Stanford University, 1975. Hydrology; Hydraulics.

ROLLINS, KYLE M., Professor. PhD, University of California, Berkeley, 1987. Geotechnical Engineering.

SAITO, MITSURU, Associate Professor. PhD, Purdue University, 1988. Transportation Engineering.

THURGOOD, GLEN S., Professor. PhD, Texas A&M University, 1975. Traffic; Transportation.

YOUND, T. LESLIE, Professor. PhD, Iowa State University, 1967. Geotechnical Engineering.

COMMUNICATIONS

Chair: Laurie J. Wilson

Graduate Coordinator: Allen W. Palmer

F-527 HFAC

Provo, UT 84602-6403

(801) 378-3832

THE PROGRAM OF STUDIES

The master's program is intended to provide advanced preparation in communication theory and research. The emphasis is on analytical thinking with consideration for both continued academic advancement and professional growth. The program of study includes a core of communication theory and research courses as well as elective courses on a number of communication-related topics.

One degree is offered through the Communications Department: Mass Communication—MA. A minor in mass communication is also offered.

The department admits 15–20 students each fall to the master's program. The average time of study to complete requirements for the master's degree is 24–30 months.

Mass Communication—MA

The master's program is intended to serve as preparation for:

- Further doctoral studies where theory, teaching, and researching are emphasized.
- Other achievements in a mass communication profession.

Beyond the below-listed courses required by the department, students select—in consultation with advisors—the specific courses that best meet their goals and interests. Generally, students with noncommunications undergraduate majors will be expected to concentrate on communications electives. Those with a communications baccalaureate are encouraged to seek the broadening of electives outside the department.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and March 15 (U.S.).
- Application requirements: the entrance examination is the GRE; minimum required GPA is 3.0 for last 60 semester hours.
- Prerequisite: baccalaureate degree (if undergraduate preparation in communications is not adequate, the department graduate coordinator will require certain courses to satisfy the deficiency); background in research and statistics (prerequisite course required); professional experience in communications is desirable; professional competence in written and spoken English is necessary.

Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours (Comms 699R).
- Required courses: Comms 609, 610, 611, 616 (12 hours), 699R (6 hours); three courses from 604, 605, 607, 613, 614.
- Electives: determined in consultation with advisor and committee.
- Thesis.
- Examinations: (A) written comprehensive examination; (B) final oral examination and defense of thesis.

Mass Communication—Minor

Consult the department chair or graduate coordinator regarding a recommended program of study.

FINANCIAL ASSISTANCE

The principal types of financial aid and awards available to mass communication graduate students are teaching and research assistantships. TAs oversee undergraduate classes and labs in advertising, broadcasting, journalism, and public relations. Applications are available by writing Bobeta Powell at E-509 HFAC, Provo, UT 84602-6403.

RESOURCES AND OPPORTUNITIES

Housed in The Harris Fine Arts Center, the Communications Department contains journalism, advertising, and broadcast laboratories and radio and television studios.

Communications Research Center. Mass communication graduate students can receive assistance from the director of the Communications Research Center and work with faculty members or receive guidance on their own research in broadcasting, journalism, advertising, and public relations. Computers with SPSS software are available in F-372 HFAC.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS**604. Seminar in History of Mass Communication. (3)**

In-depth investigation of the various aspects of the history of mass media.

605. Media Criticism/Critical Analysis of Mass Media. (3)

Methods and usefulness of communication criticism; critical approaches to media analysis; relating criticism to communication process components.

606. Management Seminar. (2)

Applications of classical and contemporary management and organizational theories as well as contemporary mass media issues and problems.

607. International Communication. (3)

Role of communication internationally and its impact on culture, ethics, morality and politics around the world. Comparison of communication systems, media flows, and communications between countries.

608. Communication Technology and Policy. (2)

Impacts of communication technologies and policy implications.

609. Proseminar. (2)

Introduction to graduate education, communication theory, and research. Faculty and working professionals present their research programs.

610. Studies in Communication Theory. (3)

Nature and content of contemporary communication theory.

611. Research Methods in Communication. (4)

Prerequisite: meet department statistics requirement (Stat 221 or 552).

Major methods of research used in communication.

612R. Research Practicum. (1)

Practical experience in research under direction of individual faculty.

613. Literature Seminar. (3)

Literature that contributes to understanding the functioning of communication processes.

614. Seminar on Ethics and Religion in Communication. (3)

Review of literature and student research projects on ethics in professional communications practice and on the interface of religion and the media.

615. Public Opinion Seminar. (2)

Concepts of public opinion and their links to interpersonal and societal processes; mass media.

616. Seminar in Mass Media and Society. (3)

Prerequisite: Comms 610, 611.

Mass media's roles in major social settings, historical development of open-system societies, contemporary ethical dilemmas, effects of new media.

617. Mass Communication and U.S. Government. (2)

Contemporary legal relationship between government and communication; philosophical and historical basis for regulation in light of constitutional guarantees.

618. Environmental Communication. (2)

Mass communication theory and research, process and practice as it relates to public communication campaigns, efforts to affect regulations and policy, and mass media coverage of environmental issues.

619. Mass Communication and Gender. (2)

Gender issues related to the communication process. Implications of recent theoretical developments in the feminist literature for communication studies.

620. The Media and Popular Culture. (2)

Cultural expression as a reflection of spirit of contemporary society. Popular culture as instrumental in furthering ideological foundations of society.

691R. Special Studies in Communications. (1-3)

Individual work on approved problems not leading to a thesis. Projects must be approved before registration.

695R. Topical Seminar. (1-3)**699R. Master's Thesis.** (6V)**FACULTY**

BAKER, SHERRY L., *Associate Professor.* PhD, University of Utah, 1994. Communications Ethics and Cultural History as Evidenced in Media Texts.

EGAN, KATHRYN S., *Professor.* PhD, University of Southern California, 1972. Broadcast Women Audiences.

HAINSWORTH, BRAD E., *Professor.* PhD, University of Utah, 1968. Issues Management.

HAMMOND, SCOTT C., *Assistant Professor.* PhD, University of Utah, 1996. Complexity Theory, Broadcast Journalism, Cross-Cultural Communications.

HUGHES, R. JOHN, *Professor.* International Media and Journalism; Editorials.

MARTIN, DENNIS G., *Professor.* PhD, University of Illinois, 1985. Advertising; Cultural Anthropology; History of Advertising.

NELSON, JACK A., *Professor.* PhD, University of Missouri, Columbia, 1971. Magazines; Journalism History.

PALMER, ALLEN W., *Assistant Professor.* PhD, University of Utah, 1996. International Mass Communications Systems; Media and the Environment.

PORTER, WILLIAM C., *Associate Professor.* EdD, Oklahoma State University, 1986. New Technologies; Writing Theory.

PRATTE, PAUL A., *Professor.* PhD, University of Hawaii, 1976. Journalism History.

RUSH, J. D., *Associate Professor.* JD, Arizona State University, 1973. Telecommunications and Technology.

STOUT, DANIEL A., *Associate Professor.* PhD, Rutgers University, 1993. Media and Religion; Social Impacts of Mass Media.

THOMSEN, STEVEN R., *Assistant Professor.* PhD, University of Georgia, 1994. New Media Technologies and Public Relations.

VALENTI, JOANN M., *Professor.* PhD, University of Michigan, 1983. Environmental Communications.

WHITING, GORDON C., *Professor.* PhD, Michigan State University, 1967. Assessment of Media Quality.

WILSON, LAURIE J., *Professor.* PhD, American University, 1988. International Communications; Public Relations and Service Learning.

COMPUTER SCIENCE

Chair: William A. Barrett

Associate Chair: Tony Martinez

Graduate Coordinator: Scott Woodfield

3361 TMCB

Provo, UT 84602-6576

(801) 378-3027

THE PROGRAM OF STUDIES

The Department of Computer Science offers two degrees: Computer Science—MS and Computer Science—PhD. On the average, the MS program in computer science has from ninety to one hundred students, and the PhD program has from fifteen to twenty.

The MS degree is designed to prepare students either to be technically capable of leading development teams in industrial software development or to be ready to continue on for a PhD. The PhD degree prepares students to be researchers and teachers either in industry or academia. Areas of particular emphasis are listed below under Resources and Opportunities and as research interests in the list of faculty.

The expected duration of the MS program for full-time students who enter without deficiencies is one and a half years. Depending on the number of deficiencies, some students may require additional semesters. Students may not enter the PhD program with deficiencies. For full-time students in the PhD program, the expected duration is three years for those entering the program with an MS in computer science and from four to four and a half years for those entering without an MS in computer science. These expectations assume that students take a full graduate load and begin and complete the steps in their thesis or dissertation research in a timely manner.

Computer Science—MS

Mission Statement. Students should be exposed to and participate in leading-edge research. Depending on their long-range objectives, students should also do one or more of the following:

- Develop skills for critical thinking and for analyzing results.
- Learn to write technically and articulately.
- Evolve research ideas and produce research results.
- Learn about group development and be technically capable of leading a development team.
- Demonstrate ability to develop software for industrial-size problems.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 20 (U.S. and international); winter, May 15 (U.S. and international); spring, September 15 (U.S. and international).
- Entrance examinations: GRE general test, and the TOEFL examination for those whose native language is not English.
- Prerequisite: baccalaureate degree in computer science or equivalent course work in related undergraduate programs. A student without an acceptable undergraduate degree in computer science may be admitted provisionally into the MS program.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (CS 699R).
- Required courses: determined in consultation with graduate committee.
- Thesis: departmental acceptance of thesis proposal before beginning thesis research.
- Examinations: final oral examination and defense of thesis.

Computer Science—PhD

Mission Statement. Students should be able to:

- Generate new ideas.

- Convince others that their ideas are worth pursuing.
- Do the necessary research to demonstrate that their ideas are viable.
- Communicate the results of their research in the public domain.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 20 (U.S. and international); winter, May 15 (U.S. and international).
- Entrance examinations: GRE general test and GRE subject test in computer science. TOEFL examination is required for those whose native language is not English.
- Prerequisite: baccalaureate degree in computer science or equivalent (students with undergraduate deficiencies should enroll in the MS program).

Requirements for Degree.

- Credit hours (66): minimum 48 course work hours plus 18 hours of dissertation research. Must include CS 510, 512, and 561.
- Dissertation.
- Examinations: (A) qualifying examinations, a series of examinations demonstrating broad proficiency in computer science, must be taken no later than one year from the student's admittance to the program; (B) preliminary examination, demonstrating preparedness to fulfill dissertation research; (C) oral defense of dissertation.
- Residency: a student must spend at least the last three consecutive semesters as a full-time resident (combined spring and summer terms count as one semester).
- Teaching: all students must teach at least one course.

FINANCIAL ASSISTANCE

The Computer Science Department recognizes that most students require financial assistance to remain in school. The department has funds to supplement students' financial needs in the following forms: internships, teaching and research assistantships; and tuition awards.

RESOURCES AND OPPORTUNITIES

For more detailed information please see our Web site:

www.cs.byu.edu

Vision, Imaging, and Computer Graphics.

Graphics is one of the strongest areas of research in the department. Ongoing research is being conducted in vision, rendering, and graphical user interfaces.

Research in computer vision deals with the recognition, representation, and descriptions of patterns and images. Current research and applications include intelligent, interactive tools for image segmentation, document compression, recognition, and understanding, automated creation of and interactions with virtual environments, digital libraries, medical imaging, and image query and compression.

Rendering research concentrates on photo realistic rendering, animation of vector field tools for computer graphics, and the representation of hyper-dimensional objects.

Research in graphical user interfaces focuses on producing tools to automatically generate user-interface software and the means to measure the effectiveness of the software.

Advanced Software and Data

Engineering. Developing better, less expensive software is the goal of this research effort. The specific areas of interest are object-oriented software development, artificial intelligence and software engineering, semistructured data, workflow, and web-based information retrieval.

The mission of the object-oriented research efforts is to develop theoretical foundations, professional engineering methods, and tools for creating object-oriented software and database systems.

The work in artificial intelligence and software engineering focuses on the application of knowledge-based techniques to address the current limitation in developing, maintaining, extending, and understanding large software systems.

Research in semistructured data investigates methods for extracting and organizing information from sources whose information has no pre-imposed schema.

Workflow research seeks to facilitate the process by which work is accomplished in organizations.

Web-based information retrieval concentrates on extraction of information distributed throughout the World Wide Web.

Hardware Performance and Dependability. Improving the performance and dependability of computer systems is critical to the use of computers in many future applications. The performance evaluation research group develops novel hardware and software techniques to measure the performance of existing computer systems. This information is used to improve computer architectures, memory hierarchies, I/O systems, operating systems, compilers, and applications. Dependability research is based on the mathematical analysis of computer hardware and software. The research efforts at BYU focus on making the formal modeling and analysis of computer systems tractable for software and hardware engineers.

High-Performance Networks and Computing. High-performance computing and communications networks are becoming an increasingly important aspect of computer science. ATM (Asynchronous Transfer Mode) network communications with emphasis on flow control and MPEG (Motion Picture Expert Group) transmission are studied in this group. An investigation of Gigabit Ethernet and IPV6 is also in progress. A low cost supercomputer is being assembled using Intel-based workstations. This machine will be used for parallel and distributed computing research with emphasis on performance analysis and solving real world problems such as parallel rendering and computational fluid dynamics.

Neural Networks and Machine Learning. Research in this area includes the proposal, extension, and

demonstration of improved learning models with respect to generalization accuracy, speed of learning, and fault tolerance. We seek models that combine the best aspects of neural network approaches with symbolic artificial intelligence machine-learning approaches.

For a more detailed description of the graduate program requirements, please see our Web site:

*[www.cs.byu.edu/
grad-info/cs-grad-hb.html](http://www.cs.byu.edu/grad-info/cs-grad-hb.html)*

COURSE DESCRIPTIONS

501R. Special Topics in Computer Science. (1-3)

Prerequisite: instructor's consent.

Special subjects as announced before each semester.

510. Formal Languages and Syntactic Analysis. (3)

Prerequisite: CS 431 or instructor's consent.

Definition of formal grammars and algorithms for syntactic analysis.

512. Analysis of Algorithms. (3)

Prerequisite: CS 312, CS 252; or instructor's consent.

Survey of important algorithms. Connections to theoretical computer science and analysis of algorithms.

521. Pattern Recognition. (3)

Prerequisite: CS 450 or equivalent.

Design and use of pattern classifiers for recognition and classification of one- and two-dimensional signals such as voice, images, and handwriting. Emphasis on images.

525. Software Creation. (3)

Prerequisite: CS 428.

Concepts of object-oriented software development and their incorporation into various object-oriented analysis and design techniques.

531. Compiler Theory and Design. (3)

Prerequisite: CS 431.

Theory and design of compilers and interpreters, including syntax-directed compilers and metacompilers.

532. Advanced Programming Languages and Models. (3)

Prerequisite: CS 431.

Definitions and implementation techniques for functional languages, logic languages, and object-oriented languages. Interactive languages and interactive programming environments.

535. (CS-Psych 577) Human-Computer Interaction. (3)

Prerequisite: graduate or senior standing.

Human/machine interfaces for hardware/software integration. Psychological principles of computer interfacing. Human engineering, ergonomics, and software design principles for user-friendly applications.

544. Advanced Operating Systems. (3)

Prerequisite: CS 345.

Advanced operating system concepts and design techniques, including concurrency, distributed systems, networking, synchronization, multitasking, etc.

545. Process Control Systems. (3)

Prerequisite: CS 245 or 345 or equivalent.

Concurrent and distributed real-time operating systems and programming environments for industrial automation.

550. Computer Vision 1. (3)

Prerequisite: CS 450 or equivalent.

Machine vision, image segmentation, mathematical morphology, image enhancement and filtering, edge detection, feature extraction, neighborhood operators, region growing, boundary detection, scene segmentation, and matching.

551. Object-Oriented Database Theory. (3)

Prerequisite: CS 452 or instructor's consent.

Application of model and proof theory to OODBs; theoretical foundations of analysis, specification, and design; conceptual model formalization.

552. Object-Oriented Database Systems. (3)

Prerequisite: CS 452 or instructor's consent.

Analysis, specification, design, and implementation of object-oriented database systems; theory of object-oriented database models and systems.

554. Distributed Databases. (3)

Prerequisite: CS 236 or equivalent.

Distributed DBMS design, architecture, query processing and optimization, data allocation, transaction management, concurrency control, recovery, integrity and security, deadlock handling.

555. Advanced Computer Graphics. (3)

Prerequisite: CS 455 or instructor's consent.

Advanced computer graphics systems programming and architecture, including ray tracing, radiosity, animation, and physically based modeling.

556. Interactive Software Systems. (3)

Prerequisite: CS 330, 455.

Techniques to implement human/computer interfaces. Primitive interactive techniques. Grammar, automata, procedure, object-based dialogue descriptions. Tools for automatically generating and evaluating user interfaces. Screen layout; data presentation tools.

557. (CS-CEEn 572-MeEn 572)**Computer-Aided Geometric Design. (3)**

Prerequisite: C, or similar computer language background.

Mathematical theory of free-form curves and surfaces and solid geometric modeling. Bezier and B-spline curve and surface theory, parametric and implicit forms, intersection algorithms, topics in computer algebra, free-form deformation. Several programming projects.

560. Computer Networks. (3)

Prerequisite: CS 460, Stat 321.

Computer networking, software architecture, organization, protocols, routing, global networks, local networks, internetworking, standards, and applications.

561. Theoretical Foundations of Computer Science. (3)

Prerequisite: CS 252 or instructor's consent.

Formal languages, automata theory, sequential machines, enumerability, computability, and undecidability.

565. Data Security. (3)

Prerequisite: CS 404. Recommended: CS 453, 560.

Data security problems and solutions. Protection of stored or transported data. Data security principles. Hardware and software systems; mathematical, technical, and legal considerations.

572. Machine Learning. (3)

Prerequisite: CS 252, 470; or instructor's consent.

Algorithmic approaches and philosophy of machine learning, emphasizing symbolic/AI approaches.

575. Expert Systems Design. (3)

Prerequisite: CS 470 or instructor's consent.

Knowledge-based systems, fundamentals of knowledge engineering, rule-based systems, tools for expert system development.

576. Intelligent Tutoring. (3)

Prerequisite: CS 575 or instructor's consent.

Taxonomy of knowledge-based computer-assisted instruction; design and evaluation of intelligent tutoring models.

578. Neural Networks and Connectionist Computing. (3)

Prerequisite: CS 252, 380; or equivalent. Recommended: CS 470 or equivalent.

Neurally inspired computer architectures and methods of computation and learning using massively parallel networks.

580. High Performance Computer Architecture. (3)

Prerequisite: CS 380 or equivalent.

Advanced topics in computer architecture, including pipelining, superpipelining, VLIW, superscalar, branch prediction, and speculative execution.

584. Parallel Processing. (3)

Prerequisite: CS 380 or equivalent.

Theoretical and practical study of parallel processing including a discussion of parallel architectures, parallel programming languages, and parallel algorithms.

586. Formal Methods in Computer System Design. (3)

Prerequisite: CS 236, 380; or equivalent.

Use of specification and verification in the design of computer systems. Introduction to mechanical theorem proving environments.

598R. Special Projects. (1-3)

Prerequisite: instructor's consent.

627. Theoretical Foundations of Software Engineering. (3)

Prerequisite: CS 525.

Introduction to theory aspects of computer science that pertain to software engineering (proof of correctness, conceptual models).

650. Computer Vision 2. (3)

Prerequisite: CS 550.

Advanced topics in computer vision: radiometric model; photometric stereo; shape from shading; monocular, binocular models; perspective projective geometry; image matching; depth from stereo; exterior, relative, interior, absolute orientation; optical flow.

678R. Topics in Neural Networks. (3)

Prerequisite: CS 578.

Advanced research topics in areas of non-von Neumann computing, including neural, connectionist, and massively parallel systems. Course tailored toward students' research goals.

699R. Master's Thesis. (Arr.)

Prerequisite: committee chair's consent.

751R. Advanced Topics in Database Systems. (3)

Prerequisite: graduate standing and instructor's consent.

799R. Doctoral Dissertation. (1-9)

Prerequisite: committee chair's consent.

FACULTY

BARRETT, WILLIAM A., *Professor.* PhD, University of Utah, 1978.

Computer Vision; Image Processing; Pattern Recognition.

BURTON, ROBERT P., *Professor.* PhD, University of Utah, 1973.

Hyperdimensional Computer Graphics; Visualization.

CAMPBELL, DOUGLAS M., *Professor.*

PhD, University of North Carolina, 1971. Complexity Theory, Natural Language Understanding.

CHRISTENSEN, LARRY C., *Professor.*

EdD, Brigham Young University, 1981. Expert Systems; Intelligent Computer-Assisted Instruction; Software Engineering.

CLEMENT, MARK J., *Assistant Professor.* PhD, Oregon State University, 1994. Parallel Processing; High-Performance Networks; Telecommunications.

CORNELL, AUREL, *Professor.* PhD, Polytechnic Institute of Timisoara (Romania), 1971. Distributed/Concurrent Programming.

EGBERT, PARRIS K., *Assistant Professor.* PhD, University of Illinois, 1992. Computer Graphics; Visualization; Virtual Reality.

EMBLEY, DAVID W., *Professor.* PhD, University of Illinois, 1976. Database Systems; Conceptual Modeling; Information Extraction.

FLANAGAN, J. KELLY, *Assistant Professor.* PhD, Brigham Young University, 1993. Computer Architecture; Performance Evaluation; Digital System Design.

HAYS, BILL, *Professor.* PhD, Northwestern University, 1970. Database Systems; Compiler Development; Programming Languages.

HIGGINS, JOHN C., *Professor.* PhD, University of California, Davis, 1966. Theoretical Foundations.

MARTINEZ, TONY, *Associate Professor.* PhD, University of California, Los Angeles, 1986. Neural Networks; Machine Learning.

MORSE, BRYAN S., *Assistant Professor.* PhD, University of North Carolina, 1994. Computational Vision; Image Processing; Medical Imaging.

NG, DENNIS, *Associate Professor.* PhD, Kansas State University, 1991. Database Systems; Logic Programming; Distributed Databases.

NORMAN, THEODORE A., *Professor.* PhD, Washington State University, 1970. Systems Simulation; 3-D Animation; Operating Systems.

OLSEN, DAN R., *Professor.* PhD, University of Pennsylvania, 1981. Human-Computer Interfaces; Programming Environments; Computer Graphics.

PETERSON, TODD, *Assistant Professor.* PhD, University of Alabama, 1998. Machine Learning.

SEDERBERG, THOMAS W., *Professor.* PhD, Purdue University, 1983. Computer Graphics; Computer-Aided Geometric Design.

SNELL, QUINN O., *Assistant Professor.* PhD, Iowa State University, 1997. Parallel Programming; Graphics; Networking.

WINDLEY, PHILLIP J., *Associate Professor.* PhD, University of California, Davis, 1990. Formal Methods; Hardware Verification; Software Specification.

WOODFIELD, SCOTT N., *Professor.* PhD, Purdue University, 1980. Software Design; Reusability; Software Engineering.

COUNSELING PSYCHOLOGY AND SPECIAL EDUCATION

Chair and Graduate Coordinator:
Ronald D. Bingham

328 MCKB
Provo, UT 84602-5093
(801) 378-3857

THE PROGRAM OF STUDIES

The Department of Counseling Psychology and Special Education prepares educators and professionals who work primarily with individuals or small groups. The programs offered in the department all pursue at least two common goals. The first is to help individuals enhance the quality of their lives through meaningful personal, educational, and career development. A second common goal is to assist people in overcoming barriers to learning and to success and happiness in life. These barriers include difficulty in thinking, reading, studying, learning, making decisions, relating to others, understanding the impact of their behavior, etc.

The programs utilize a scholar/practitioner model where students and faculty enhance science and learning through research and inquiry. Further, in dealing with those whom they serve, they apply the principles learned. Since their work is often highly personal, it is essential that students possess/develop integrity and professional standards of ethical conduct. They must also develop the knowledge and skills essential to promote positive change in individuals struggling with important aspects of their lives. The settings in which graduates typically serve include public and private schools and colleges and universities.

Each program assists students in planning individual course work, receiving supervised practical experience, and obtaining appropriate

credentials, certification, or licensure.

Three degrees are offered through the Department of Counseling Psychology and Special Education: Special Education—MS; Counseling and School Psychology—MS; and Counseling Psychology—PhD.

The average number of students admitted each year varies by program as follows:

Special Education	15
Counseling and School Psychology	16
Counseling Psychology	6

Special Education—MS

The program in special education focuses on the preparation of thoughtful, ethical, and moral professionals who understand and respond effectively to the needs of students with disabilities and their families. Additionally, the program emphasizes the development of collaborative relationships with general education personnel in meeting the needs of all students.

Three areas of emphasis are available within the graduate program. These include pupils with mild/moderate disabilities, those with severe/profound disabilities, and those needing gifted education.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: GRE examination and the Area of Special Education Application for Admission and related candidate evaluation forms.
- Prerequisite: completion of an undergraduate degree in early childhood, elementary, secondary, or special education and successful experience as a general or special education teacher in a public school or related setting.

Requirements for Degree.

- Credit hours : 42 hours minimum for thesis option; 45 hours minimum for nonthesis option.

- Required courses: consult area specialty coordinators.
- Residence: all course work must be completed on BYU campus or in related partnership or approved school site.
- Examinations: written comprehensive examination.

Counseling and School Psychology—MS

The MS degree in counseling and school psychology prepares students to pursue certification as both counselors and school psychologists in K-12 educational settings.

Knowledge and competency areas include counseling (individual and group); responsive services; consultation with parents, teachers, school administrators, and other professionals; child and adolescent psychopathology; learning theory; career development; comprehensive guidance programming; promotion of healthy growth and development; prevention of problems; assessment leading to intervention with educational, personal/social, career, and mental health issues; multicultural counseling; professional roles and expectations; ethics; family and institutional systems; and research and evaluation.

This nonthesis program requires full-time day attendance beginning summer term and continuing without interruption through six semesters (accumulating 64 semester hours). Students are placed in practicum (beginning the first fall semester) and internship (beginning the second fall semester) sites where they provide counseling and psychological services under the supervision of a certified/licensed site supervisor and a university faculty supervisor.

Admission and Entry.

- Semesters of entry and application deadlines: summer, February 1 (U.S. and international).
- Application requirements: the entrance examination is the GRE general test. When taking the GRE, use the institutional number R 4019. Application will not be considered without GRE scores.

Because of the nature of the helping professions, both academic and personal qualifications are considered in selecting applicants and in evaluating, retaining, and graduating students.

- Prerequisite: undergraduate major in education, psychology, or one of the social sciences is preferred but not required; experience in a helping profession is desired but not required.

Requirements for Degree.

- Credit hours: minimum 64 hours of approved course work including practica and internship.
- Required courses: consult department program documents.
- Minor (optional): approved by graduate committee.
- Residence: full-time day attendance the first year, followed by a nine-month internship in a school setting.
- Examination: written comprehensive.
- Internship: see department program documents for specifics.

Counseling Psychology—PhD

The PhD in counseling psychology is primarily psychological in nature and is based upon the scholar-practitioner model of training. The scholar-practitioner model is an integrated approach to training that acknowledges the interdependence of theory, research, and practice.

The counseling psychology program at BYU emphasizes the educational, developmental, and preventive functions of counseling psychologists and counselor educators. Students are primarily prepared to work as counseling psychologists in counseling centers and in academic departments in university and college settings. Students are also prepared to make remedial interventions. Graduates should anticipate careers on college and university campuses as counselors, counseling psychologists, or counselor educators.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).

- Application requirements: the entrance examination is the GRE general test. When taking the GRE, use the institutional number R 4019. Applications will not be considered without GRE scores.

Because of the nature of the helping professions, both academic and personal qualifications are considered in selecting applicants and in evaluating, retaining, and graduating students.

- Prerequisite: master's degree in counseling or psychology or in an approved, closely related field.

Requirements for Degree.

- Credit hours: 93 plus dissertation and internship.
- Required courses: consult department program documents.
- Minor (optional): approved by graduate committee.
- Residence: minimum two consecutive full-time semesters beyond the master's degree (minimum 6 credit hours each semester) on the BYU Provo campus.
- Skill requirement: consult department.
- Predoctoral internship (2,000 hours).
- Dissertation.
- Examinations: (A) counseling performance evaluations; (B) written comprehensive examination at completion of course work; (C) oral defense of dissertation.

FINANCIAL ASSISTANCE

Graduate Assistantships. Graduate assistantships include working with selected faculty members on research projects, curriculum development, and other assignments for 5 to 20 hours per week. Several other organizations on campus, such as the Counseling and Career Center, often request doctoral students to serve as graduate assistants. A student must apply for the assistantships each semester or term.

Partial Tuition Waivers.

Applications are reviewed on the basis of scholarship and financial need. The award is usually either a

one-quarter or one-half tuition waiver.

Scholarships. A small number of modest, specific-interest scholarships are also available.

Contact the department secretary for application forms, deadlines, and additional information about departmental financial assistance.

Other sources of financial aid are available to students through the Financial Aid Office, A-41 ASB, Provo, UT 84602-1009.

RESOURCES AND OPPORTUNITIES

Counseling Psychology Center. This center affords students an opportunity to learn and practice a variety of applications for the principles and theories they study in their course work. Through practical applications students gain valuable experience in diagnosing learning and achievement difficulties; remedying learning and behavioral problems; consulting with parents, teachers, and other professionals regarding strategies for helping the center's clients; counseling individuals with academic, vocational, or personal problems; and giving career assessment and guidance to young people and adults.

Computer Laboratories. Terminals in the computer laboratories provide graduate students direct line access to the university's computers, enabling students to use several programs, such as SPSS and SAS, to analyze research data. These terminals also permit access to the Internet, library databases, etc.

Graduate Student Project and Research Laboratory. Space is provided for graduate students who are working with faculty on research, evaluation, and development projects.

Study Areas. Graduate study areas are available in the Counseling Psychology Student Center, the McKay School of Education Learning Resource Center, and the Harold B. Lee Library.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

Note: CSE 514R and 515R courses are for certification purposes only and are listed in the BYU Undergraduate Catalog. No graduate degree credit is given for 514R; 515R credit may count toward a graduate degree if prior approval is obtained from the graduate committee.

503. Education of Individuals with Disabilities. (3)

Prerequisite: concurrent registration in student teaching or internship.

Developing, implementing, and evaluating programs for individuals with disabilities.

505. Educational and Multicultural Issues in Special Education. (3)

Special education issues: multicultural, historical, and legal foundations.

510. Applied Behavior Analysis. (3)

Strategies and tactics for educating individuals with emotional and behavior problems. Prevention, early intervention, and treatment strategies.

511. Curriculum for Individuals with Emotional and Behavioral Disabilities. (3)

Prerequisite: CSE 510 and instructor's consent.

Instructional strategies for children with emotional and/or behavioral disabilities.

519. Assessment: Severe Disabilities. (1-3)

Foundation course in assessing, diagnosing, and evaluating individuals with severe/profound disabilities.

521. Curriculum and Instruction: Severe Disabilities. (1-3)

Developing basic skills in instructional content and practice for individuals with severe/profound disabilities.

526. Curriculum and Instruction: Mild/Moderate Disabilities. (1-3)

Strategies for designing and implementing educational programs, curricula, and teaching methods for students with mild/moderate disabilities.

532. Assessment, Diagnosis, and Evaluation. (3)

Prerequisite: admission to special education master's program.

Principles and concepts of effective assessment, diagnosis, and evaluation of individuals with disabilities.

533R. Practicum in Assessment: Mild/Moderate Disabilities. (1-3)

Assessing, diagnosing, and evaluating individuals with disabilities.

534. Principles of Effective Instruction. (1-3)

Principles of effective instruction, based on educational and psychological research; application to teaching students with disabilities.

535R. Practicum in Curricula/Instruction. (1-3)

Prerequisite: admission to special education master's program.

Instructional content and practices with individuals with disabilities in a variety of educational settings.

536. Managing Behavior and Learning Environments. (1-3)

Prerequisite: admission to special education master's program.

Principles, procedures, and strategies for classroom behavior management, social skills development, and learning environment enhancement.

537R. Practicum in Managing Behavior and Learning Environments. (1-3)

Prerequisite: admission to special education master's program.

Behavior and classroom management.

545. Gifted: Creativity and Thinking Strategies. (2)

Nature of creativity and approaches to nurturing it.

546. Helping Relationships: Basic Concepts and Skills. (1-3)

Basic interviewing and helping skills. For students interested in professional, paraprofessional, peer, or lay counseling.

580R. Directed Observation in the Schools. (1-3)

Prerequisite: instructor's consent.

583R. Prepracticum Experience: Severe/Profound Disabilities. (1-8)

Prerequisite: admission to teacher education and concurrent registration in CSE 519.

Prepracticum in assessment, diagnosis, and evaluation of individuals with severe/profound disabilities. Fee.

585R. Practicum: Individuals with Severe/Profound Disabilities. (1-8)

Prerequisite: admission to teacher education and concurrent registration in CSE 521.

Practicum in instructional content and practice for individuals with severe/profound disabilities.

586R. Student Teaching: Mild/Moderate Disabilities. (1-8)

Prerequisite: completion of all certification courses or concurrent registration in remaining courses.

Student teaching with individuals with mild/moderate disabilities, including assessment, IEP development, curriculum design and/or adaptation, behavior management, teaching, and evaluation. Fee.

587R. Student Teaching: Individuals with Severe/Profound Disabilities. (1-8)

Prerequisite: admission to teacher education.

Student teaching; practicum with individuals with severe/profound disabilities. Fee.

599R. Academic Internship: Special Education. (1-9)

Prerequisite: completion of all certification courses or concurrent registration in remaining courses.

Teaching, supervising, and managing behavior, including assessment, diagnosis, evaluation, individual and group instruction, IEP development, and other teaching functions.

600. Introduction to Counseling and Guidance Services. (3)

Independent Study also; no graduate degree credit given for Independent Study.

Introduction to the counseling profession: history, philosophy, issues, trends, and current status. Role of counselor in school and community agency settings.

602. Child/Adolescent Psychopathology: Diagnosis and Intervention (3)

Etiology and diagnosis of dysfunctional behavior and maladjustment, with interventions for school-age children and adolescents. DSM-IV and IDEA diagnostic systems.

605. Professional Roles and Standards. (1)

Prerequisite: admission to graduate study in counseling/school psychology.

Professional roles, functions, trends, standards, history; professionalism, credentialing, issues; collaborative relationships with other professionals.

606. Psychoeducational Foundations. (3)

Basic educational and counseling philosophy; tests and measurement theory; professional roles and challenges; the school counselor-psychologists' personal impact on students and programs.

609. Assessment, Diagnosis, and Evaluation: Mild/Moderate Populations. (3)

Prerequisite: CSE 532, 533R.

Advanced concepts and principles in assessment, diagnosis, and evaluation of individuals with mild/moderate disabilities.

610. Consultation Within School and Family Systems. (3)

Models and methods of consultation with teachers, parents, and professionals.

611R. Practicum in Assessment, Diagnosis, and Evaluation: Mild/Moderate Populations. (3)

Prerequisite: CSE 532, 533R.

Advanced practicum in assessment, diagnosis, and evaluation of individuals with mild/moderate disabilities.

612. Curricula and Effective Instruction: Mild/Moderate Populations. (3)

Prerequisite: CSE 534, 535R.

Advanced concepts and skills in developing curriculum and using specialized instructional approaches for individuals with mild/moderate disabilities.

613R. Practicum in Curricula and Effective Instruction: Mild/Moderate Populations. (3)

Prerequisite: CSE 534, 535R.

Advanced practicum in instructional content and practice with individuals having mild/moderate disabilities.

614. Applied Behavior Analysis. (3)

Principles of applied behavior analysis in context of school programs, human services, families, and communities.

615R. Practicum in Applied Behavior Analysis. (1)

Application of behavioral analysis in conducting functional assessments and in designing and implementing behavioral interventions.

620. Models of Gifted/Talented Education. (2)

Varied programs for gifted and talented students in the schools.

621. Gifted: Curriculum and Effective Instruction. (2)

Designing curriculum and instruction for gifted and talented students in the schools.

622. Theories of Learning and Cognition. (3)

Learning and cognitive development theories and their application to attitudinal and behavioral change.

626. Advanced Curriculum in Special Education. (3)

Prerequisite: CSE 205 or equivalent.

630. Gifted: Practicum. (1-4)

Experience in a school setting under the direction of college faculty.

631. Advanced Assessment, Diagnosis, and Evaluations: Severe/Profound Populations. (3)

Prerequisite: CSE 532, 533R.

Advanced concepts and principles in assessing, diagnosing, and evaluating individuals with severe/profound disabilities.

632R. Advanced Practicum in Assessment, Diagnosis, and Evaluation: Severe/Profound Populations. (3)

Prerequisite: CSE 532, 533R.

Advanced practicum in assessing, diagnosing, and evaluating individuals with severe/profound disabilities.

634. Advanced Curricula and Effective Instruction: Severe/Profound Populations. (3)

Prerequisite: CSE 534, 535R.

Advanced concepts and skills in developing curriculum and using specialized instructional approaches for individuals with severe/profound disabilities.

635R. Advanced Practicum in Curricula and Effective Instruction: Severe/Profound Populations. (1)

Prerequisite: CSE 534, 535R.

Advanced practicum in instructional content and practice with individuals having severe/profound disabilities.

636. Advanced Management of Behavior and Learning Environments: Severe/Profound Populations. (3)

Prerequisite: CSE 614, 615R.

Advanced procedures and concepts in managing behavior and learning environments for individuals with severe/profound disabilities.

637R. Advanced Practicum in Managing Behavior and Learning Environments: Severe/Profound Populations. (1)

Prerequisite: CSE 614, 615R.

Advanced practicum in managing behavior and learning environments for individuals with severe/profound disabilities.

644. Career Development and Assessment. (3)

Theories of career development in lifespan and career counseling. Assessing interests, values, and other characteristics related to career decision making.

645. Appraisal Theory and Practice in Counseling. (3)

Testing and appraisal theory. Administration and interpretation of group standardized tests: personality, interest, relationship, achievement, ability, behavior, and career.

646. Counseling Theory and Interventions. (3)

Various theories of counseling, current research, processes, and micro-skills training for interviewing and relationship building. Lab required.

647. Psychometric Foundations and Assessment of Intelligence. (3)

Prerequisite: admission to graduate study in counseling/school psychology or counseling psychology.

Testing and measurement theory and experience in administering, scoring, and interpreting various standardized and individual intelligence tests.

648. Group Counseling and Intervention. (3)

Primarily group approaches to personal and social counseling and guidance, including skill-streaming groups, divorce and loss groups, parent education groups, grief therapy interventions, and problem-focused interventions.

649. Human Growth and Development. (3)

Psychoeducational aspects of developmental theory across the life span, including psychosocial, moral, ego, cognitive, faith, and identity. Developmental implications in the counseling process.

650. Leadership in Student Services. (3)

Applying leadership and administrative theory and methods to student services in school and related educational settings. Helping skills for counselors, school psychologists, principals, teachers, and others interested in the learning and emotional climate of the school.

651. Multicultural Counseling. (3)

Diversity: age, gender, religion, culture; socioeconomic traditions and issues; assessment; and helping theories and skills.

654. Comprehensive Developmental Guidance. (3)

Components and integration of a comprehensive developmental guidance program, including planning, crisis intervention, responsive services, evaluation, guidance curriculum, and applied approach to career guidance.

655. Crisis Intervention. (3)

Human crises; preventive, developmental, and remedial interventions within school and family systems.

656. Spiritual Values and Methods in Psychotherapy. (3)

Spiritual values and perspectives, issues, and approaches in counseling and psychotherapy.

672. Empirical Inquiry. (3)

Introduction to empirical research. Designing, conducting, analyzing, reporting, and evaluating research studies in counseling, school psychology, and related areas.

678. Practicum 1: Counseling and School Psychology. (3)

Prerequisite: instructor's consent.

Beginning experiences in observing counseling and school psychology techniques in K-12 educational settings. Practicing basic counseling and intervention procedures under individual and group supervision.

679. Practicum 2: Counseling and School Psychology. (3)

Prerequisite: CSE 678.

Intermediate clinical experience in counseling and school psychology, including individual and group counseling, consultation, testing, in-service, career and education guidance, and therapeutic interventions in an education setting under supervision.

680R. Internship: Counseling and School Psychology. (2)

Prerequisite: CSE 679.

Concluding supervised practicum experience in counseling, therapy, and interventions. Testing, consultation, and other activities of the counselor and school psychologist.

690R. Seminar. (1-4)

Check current class schedule for seminar topics.

692R. Advanced Topics. (1-3)

693R. Directed Individual Study. (1-3)

Prerequisite: instructor's consent.

695R. Counseling Seminar. (1-3)

697R. Special Projects. (1-6)

Prerequisite: Stat 552 and CSE 672 or equivalent.

699R. Master's Thesis. (1-6)

702. Philosophy and Theories in Counseling Psychology. (3)

Introduction to counseling psychology. Philosophical assumptions and theoretical perspectives. Integration of science and practice within a consistent philosophical framework.

710. Ethical/Legal Standards and Issues. (3)

Ethical and legal standards and issues in the helping professions.

715. Diagnosis and Treatment of Mental Disorders. (3)

Diagnosis, classification, and treatment of emotional problems and mental disorders.

725. Objective and Projective Personality Assessment (3)

Prerequisite: instructor's consent.

Objective assessment of personality (including MMPI) as well as projective techniques (including TAT). Pragmatic psychological report writing.

744. Advanced Career Counseling. (3)

Survey of current research in career psychology. Advanced career counseling techniques focusing on the interface between career and personal issues and the use of assessment.

746. Supervision and Consultation Theory (3)

Theoretical models and approaches to consultation and supervision of counseling; practice in supervising counselors in training.

748. Advanced Theory of Group Counseling. (3)

Theory and methods of group counseling and insight therapeutic groups; advanced skills in conducting group therapy.

749. Data Analysis and Statistics. (3)

Prerequisite: Stat 510, 511, 512; concurrent registration in CSE 750. Use of SPSS as a quantitative research tool. Conceptual integration of statistics and research design.

750. Research Theory and Methods in Counseling Psychology. (3)

Prerequisite: CSE 672, Stat 552 or 510; admission to PhD program in counseling psychology.

Advanced counseling process and outcome research methods. Includes between groups, within-subjects experimental designs; quasi-experimental and times series designs; discovery-oriented, small N, and qualitative research strategies.

776R. Advanced Practicum 1: Counseling Psychology. (3)

Prerequisite: admission to graduate study in counseling psychology.

Clinical experiences conducted primarily through collaboration with BYU's Counseling and Career Center and focusing on career and educational counseling.

777R. Advanced Practicum 2: Counseling Psychology. (3)

Prerequisite: admission to graduate study in counseling psychology.

Clinical experiences and psychotherapeutic training conducted primarily through collaboration with BYU's Counseling and Career Center and focusing on personal and social adjustment counseling.

778R. Counseling Psychology Clerkship. (3)

Prerequisite: admission to graduate study in counseling psychology.

Clinical experiences and psychotherapeutic training conducted off campus in an approved community agency clinical setting.

779R. University Teaching Practicum. (3)

Prerequisite: admission to graduate study in counseling psychology

University teaching under supervision of a faculty member, including teaching or team teaching an undergraduate course and/or team teaching a master's level course (or portions of courses). Weekly supervisory and training session required.

780R. Predoctoral Counseling Psychology Internship. (1-9)

Prerequisite: CSE 779R, all other course work, and comprehensive examinations.

One calendar year of full-time or two years of half-time supervised clinical counseling and psychotherapy for a total of 2,000 clock hours.

790R. Advanced Seminar. (1-4)

Prerequisite: departmental consent.

799R. Doctoral Dissertation. (1-9)

Prerequisite: completion of skill requirements.

Formal report and defense of substantive research topic designed to make an original contribution to knowledge in the field. Only 3 hours of 799R may be used in establishing residency requirements.

FACULTY

BINGHAM, RONALD D., Professor.

PhD, Pennsylvania State University, 1970. Counseling; Mental Health.

DYCHES, TINA T., Assistant Professor.

EdD, Illinois State University, 1995. Severe Disabilities.

FISCHER, LANE, Assistant Professor.

PhD, University of Minnesota, 1991. Counseling; School Psychology.

GIBB, GORDON S., Assistant Professor.

PhD, University of Utah, 1994. Mild/Moderate Disabilities.

HEAPS, RICHARD A., Professor. PhD,

University of Utah, 1970. Counseling; Victims of Disaster.

INGRAM, CREGG F., Professor. EdD,

University of Kentucky, 1974. Special Education; Instructional Systems.

ISAKSON, RICHARD L., Associate

Professor. PhD, Cornell University, 1975. Counseling.

JACKSON, AARON P., Assistant

Professor. PhD, University of Missouri, Columbia, 1993. Career Development of Native Americans; Counseling Outcomes.

KRAMER, GARY L., Professor. PhD,

Oregon State University, 1977. Educational Psychology.

RICHARDS, P. SCOTT, Associate

Professor. PhD, University of Minnesota, 1988. Counseling; Religious Values.

TODD, SALLY M., Associate Professor.

PhD, University of Arizona, 1973. Educational Psychology; Gifted and Talented.

WARD, G. ROBERT, Professor. PhD,

Michigan State University, 1965. Counseling.

YOUNG, JAMES R., *Associate Professor*. PhD, George Peabody College of Vanderbilt University, 1970. Educational Psychology.

YOUNG, K. RICHARD, *Professor*. PhD, University of Utah, 1973. Educational Psychology; Emotional/Behavioral Disorders; At-Risk Youth and Dysfunctional Families.

DANCE

Chair: Sara Lee Gibb
Graduate Coordinator: Pamela S. Musil

294 RB
 Provo, UT 84602-2005
 (801) 378-5087

THE PROGRAM OF STUDIES

The Department of Dance at Brigham Young University defines dance in three dimensions—the physical, the intellectual, and the spiritual. Dance refines and integrates the body, mind, and spirit in a continual pursuit of excellence.

The Dance Department is committed to preparing reflective, articulate dance artists, teachers, and scholars. Honoring and preserving the past as it gives voice to the present and seeks to define the future, the dance program provides for study, research, experimentation, practice, and the creation and performance of new works. And, in addition to rigorous preparation in dance, the department has many opportunities for collaborative work with other arts and science disciplines.

The graduate program requires a breadth and depth of inquiry and exploration that extends beyond individual dance genres and styles, encompassing the theory and principles of the discipline. To this end, the graduate program seeks to enhance an undergraduate foundation in dance with the following academic goals: (1) intensify learning in selected areas of emphasis within the dance discipline by providing demanding course work; enhanced creative, pedagogical, and research opportunities; and real-life experiences; (2) foster the development of significant new ideas and creative works through careful research, rigorous intellectual inquiry, and masterful artistic effort; (3) recognize, acknowledge, and preserve our cultural and intellectual heritage; and (4) carefully prepare well-qualified

professionals who not only do but also contemplate, comprehend, and articulately express what has been found.

The Department of Dance maintains an average of twenty to twenty-five graduate students. The program is designed to be completed in three or four semesters.

One degree is offered through the Department of Dance: Dance—MA.

Dance—MA

This graduate program provides focus in two areas of emphasis: (1) choreography/performance and (2) pedagogy/research. Areas of emphasis are determined by elective choices beyond the required core of dance studies.

Admission and Entry.

- Semesters of entry and application deadlines: fall and summer, February 1. By the posted deadline, all parts of the completed application must have been received by the Dance Department Graduate Office. To be complete the application must include all items requested in the application packet provided by the department. **Note:** Candidates may enter either fall or summer. The fall entry program is designed to be completed in three or four semesters. The “summer only” program is designed to be completed in four summers. Entry into the summer program is offered only in odd-numbered years.
- Prerequisite: baccalaureate degree in dance with knowledge and competency equivalent to that required in the undergraduate program at Brigham Young University; applicants will be required to satisfy deficiencies.
- Application requirement: GPA must be a minimum 3.0 for last 60 hours of undergraduate work.
- Entrance examination: GRE general test. Application will not be considered without GRE scores. Please allow 4–6 weeks after the test date for scores to be received by the Office of Graduate Studies.

- **Audition:** All applicants except current BYU undergraduate dance majors must audition in person or submit a videotape (or other suitable documentation) demonstrating basic dance competency and proficiency in one or more of the following areas: choreography, performance, pedagogy, research. Contact the Dance Department for an audition date and/or guidelines for making an audition videotape.

Requirements for Degree— Choreography/Performance Emphasis

- **Credit hours (30):** minimum 24 course work hours plus 6 thesis hours (Dance 699R).
- **Required courses (15 hours):** Dance 540R or 630R (4 hours), 611 (3 hours), 612 (1 hour), courses selected from 640 through 653 (3 hours), courses selected from 660 through 663 (4 hours).
- **Dance electives (5 hours):** selected from Dance 500R, 540R, 555, 562R, 563R, 599R, 630R, 638R, courses not previously selected from 640 through 653, courses not previously selected from 660 through 663, 695R, 697R.
- **Electives (4 hours):** selected from graduate courses in any college. For example, anthropology, art, dance, humanities, music, physical education, theatre, or other graduate programs as determined in consultation with graduate committee.
- **Completion of at least one advanced ballet or modern technique class during each semester of enrollment (may or may not be part of required or elective courses).**
- **Successful periodic reviews of progress.**
- **Formal presentation and documentation of student choreography and/or performance.**
- **Thesis:** includes written and oral presentation of three-chapter thesis prospectus.
- **Examinations:** (A) comprehensive oral examination on course work; (B) oral defense of thesis.

Requirements for Degree— Pedagogy/Research Emphasis

- **Credit hours (30):** minimum 24 course work hours plus 6 thesis hours (Dance 699R).
- **Required courses (15 hours):** Dance 540R or 630R (4 hours), 611 (3 hours), 612 (1 hour), courses selected from 640 through 653 (3 hours), courses selected from 660 through 663 (4 hours). (Pedagogy emphasis must take 651.)
- **Dance electives (5 hours):** selected from Dance 500R, 540R, 555, 562R, 563R, 599R, 630R, 638R, courses not previously selected from 640 through 653, courses not previously selected from 660 through 663, 654, 697R.
- **Electives (4 hours):** selected from graduate courses in any college. For example, anthropology, art, dance, humanities, music, physical education, theatre, or other graduate programs as determined in consultation with graduate committee.
- **Successful periodic reviews of progress.**
- **Formal written thesis.**
- **Thesis:** includes written and oral presentation of three-chapter thesis prospectus.
- **Examinations:** (A) comprehensive oral examination on course work; (B) oral defense of thesis.

FINANCIAL ASSISTANCE

Substantial financial assistance is available to qualified graduate students in the form of teaching assistantships, research assistantships, choreographic or research internships, and departmental academic or performance scholarships.

RESOURCES AND OPPORTUNITIES

The Department of Dance is housed in the Richards Building, whose facilities are among the best in the nation. Faculty and dancers have access to eleven fully equipped and air-conditioned rehearsal studios, two of which convert into dance production studios. Two full-scale

theatres in the Harris Fine Arts Center and an additional 10,000 seats in the Marriott Center are available for major concerts given by the Dance Department's world-famous performing groups, The Dancers' Company, Ballroom Dance Company, DanceEnsemble, International Folk Dance Ensemble, and Theatre Ballet, as well as visiting guest artists.

Other resources include: the Biomechanics Laboratory and the Learning Resource Center. In the Biomechanics Lab, special cameras and other equipment, including a neumatic digitizer for quantitative analysis of motion, are available to assist researchers in the analysis of performance in sport and dance from a biomechanical perspective.

The Learning Resource Center contains eighteen individual study areas for graduate students as well as computer, audio, and video equipment to assist them in their work.

Other important resources include:

- **Laser disc/computer technology** for use in a variety of settings for study and further development.
- **Dance conditioning laboratory** for use with major body therapies, particularly conditioning with the use of Pilates-based equipment.
- **Media Services**, accessible by graduate students for teacher assistant instruction and course purposes. (A fee may be assessed for personal use.)
- **A sound room** for recording and editing.
- **Library support** for graduate work in dance, with access to over 30 million title records through inter-library loan with membership in RLIN. Printed and CD-ROM versions of the Dictionary Catalogue of the New York Public Library Dance Collection is available.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500R. Workshop in Dance. (1-3)

Experience with Workshop in Dance: aerobic, ballet, ballroom, folk, modern.

540R. Modern Dance Technique and Theory 5. (2)

Prerequisite: Dance 340R or equivalent.

Advanced technique, with movement combinations emphasizing dance as a performance art.

555. Dance Production. (2)

Prerequisite: Dance 355 or equivalent.

Technical and design aspects of dance production.

562R. Modern Dance Composition, Advanced. (1)

Prerequisite: Dance 362 or instructor's consent.

Development of substantive modern dance compositional works based on intent, form, and content relationships.

563R. Modern Dance

Improvisation, Advanced. (1)

Prerequisite: Dance 363 or instructor's consent.

Developing advanced skills of immediate movement response to enhance nonverbal communication.

611. Introduction to Graduate Studies and Research Methods in Dance. (3)

Orientation to program requirements. Fundamental dance research methods and frameworks of analysis. Designing, analyzing, interpreting, critiquing, and reporting on dance research.

612. Master's Thesis Seminar. (1)

Prerequisite: Dance 611.

Guided direction in creation of master's thesis, emphasizing prospectus chapters.

630R. Dance Technique, Advanced. (1-2.5)

Prerequisite: instructor's consent.

Course designed for higher-level assignment and credit while attending ballet, ballroom, folk, or modern advanced technique course.

638R. Dance Performance. (1-2)

Prerequisite: instructor's consent.

Performing with a BYU dance company.

640. Creativity. (1)

Relationship of creativity to the discipline of dance.

641. Cultural Aspects of Dance. (1)

Cultural influences upon dance.

642. Contemporary Issues. (1)

Contemporary issues in dance.

643. Dance Aesthetics. (1)

Aesthetic principles and concepts as they relate specifically to dance as an art form.

650. Dance Criticism. (2)

Introduction to writings of major dance critics, issues in reviewing performances, and practice in writing reviews.

651. Dance Pedagogy. (2)

Prerequisite: undergraduate course in dance methodology or equivalent.

Nature and application of pedagogy from universal and dance perspectives.

652. Exploration of Dance Therapies. (2)

Study of concepts of and approaches in dance therapy and body therapies.

653. Movement Analysis Systems. (2)

Comparison of various systems of analyzing and recording movement. Emphasis on methods of objectifying movement to facilitate qualitative interpretation.

654. Dance and Related Fine Arts. (2)

Dance as it relates to art, literature, music, and theatre.

660. Dance Composition—Theory and Principles. (2)

Scholarly research in dance composition.

661. Dance Improvisation—Theory and Principles. (2)

Prerequisite: Dance 451 or equivalent.

Research in dance improvisation.

662. Dance Performance—Theory and Principles. (2)

Research in dance performance.

663. Dance Technique—Theory and Principles. (2)

Research in dance technique.

697R. Individual Research and Composition in Dance. (1-4)

Prerequisite: admission to graduate study in dance.

Pedagogical research, choreographic, or performance project (faculty approved and supervised). Presentation of resultant product required.

699R. Master's Thesis. (1-6)

FACULTY

ALLEN, SANDRA BIRCH, *Associate*

Professor. MFA, University of Utah, 1967. Ballet; Methodology; Technique; History.

ANDERSON, COLLEEN, *Assistant*

Professor. MA, Brigham Young University, 1985. Folk and Ethnic Dance Forms.

BERRETT, MARILYN, *Associate Professor.*

MA, Brigham Young University, 1984. Modern Dance; Dance Education; Technique.

BLACK, CATHERINE H., *Professor.*

MFA, University of Utah, 1972. Dance History; Modern Dance; Choreography; Performance; Research Methods.

DAVIS, SUSANNE, *Dance Professor.* MS,

Brigham Young University, 1971. American and Folk Dance Forms; Cultural Aspects; Pedagogy; Anthropology.

DEBENHAM, H. PATRICK, *Associate*

Professor. MA, University of California, Los Angeles, 1976. Modern Dance; Choreography; Technique; Performance; Music Dance Theatre, Laban Movement Analysis; Bartenieff Fundamentals.

GIBB, SARA LEE, *Professor.* MS,

Brigham Young University, 1970. Modern Dance; Dance Education; Pedagogy; Dance and Body Therapies.

HOLMAN, CURT, *Assistant Professor.*

MA, Brigham Young University, 1996. Ballroom Dance; Technical Annotation of American-Style Ballroom Dance.

MUSIL, PAMELA S., *Assistant Professor*. MA, Brigham Young University, 1985. Modern Dance; Dance Education; Dance Science; Technique.

PHILLIPS, REBECCA WRIGHT, *Assistant Professor*. MFA, University of Utah, 1990. Modern Dance; Music Dance Theatre; Technique; Choreography; Performance.

PROHOSKY, CAROLINE, *Associate Professor*. MA, University of California, Los Angeles, 1980. Modern Dance; Choreography; Technique; Performance.

ECONOMICS

Chair: Farrell E. Jensen

130 FOB
Provo, UT 84602-2363
(801) 378-2859

THE PROGRAM OF STUDIES

The Department of Economics does not offer a graduate degree but offers the following graduate courses:

COURSE DESCRIPTIONS

580. Advanced Price Theory. (3)
Prerequisite: Econ 378, 380, 382, or equivalent.

Individual behavior and markets.

581. Advanced Macroeconomics. (3)
Prerequisite: Econ 378, 380, 381, 382.

Income, unemployment, and price-level analysis.

582. Welfare Economics. (3)
Prerequisite: Econ 378, 380, 382.

General equilibrium theorems and considerations that must guide applied economic work and provide quantitative information on effects of alternative policy measures.

586. Mathematical Economics. (3)
Prerequisite: Econ 378, 380, 381, 382, or equivalent.

Mathematical modeling of economic behavior.

588. Econometrics. (3)
Prerequisite: Econ 378, 380, 381, 382, 388.

Theory and practice of economic measurement.

599R. Academic Internship: Supervised Management and Training. (2-6)
Prerequisite: course work pertinent to proposed experience.

FACULTY

For faculty listings, refer to the BYU Undergraduate Catalog.

EDUCATIONAL LEADERSHIP AND FOUNDATIONS

Chair: E. Vance Randall

310 MCKB
Provo, UT 84602-5092
(801) 378-6070

E-mail: vance_randall@byu.edu

Internet:

<http://mse.byu.edu/mse/edl.html>

Fax: (801) 378-7740

THE PROGRAM OF STUDIES

Statement of Purpose. The primary task of good leaders is to help others realize their potential.

That significant task cannot be accomplished solely via "doing" or "acting," because mere performance can be calculated and trivialized. Deeper than our observable behavior is our "being," our essential self. We believe good leadership is a matter of becoming someone, as well as doing something.

Insofar as programs of the department provide for both the "becoming" as well as the more typical "doing," graduates acquire the potential to make a genuine difference in the profession of education. By being more than simply technically competent, graduates of the department can affect positively the thoughts, actions, and relationships not only of school personnel, but of other colleagues as well, in corporate, community, governmental, and ecclesiastical settings.

The department assists students in developing individualized study plans in courses such as administration, instructional leadership, teaching and learning, finance, law, policy development, research, educational philosophy, human resources development, and organizational behavior.

The Department of Educational Leadership and Foundations offers three degrees: Educational Leadership—MEd, Educational

Leadership—EdD, and Educational Leadership—PhD.

Students may be admitted for graduate study on a part- or full-time basis.

Educational Leadership—MEd

Students interested in receiving a master's degree in the department are typically professional educators who wish to become school administrators at the K–12 level or who are interested in study of the various aspects of school organization, supervision, and leadership and educational foundations.

Admission and Entry.

- Application deadlines: January 31 of the year in which enrollment is desired.
- Application requirements: minimum 3.0 GPA for last 60 semester hours.
- Entrance examinations: GRE or LSAT; for international applicants, TOEFL. (A TOEFL score of 550 or higher is required.)
- Prerequisite: baccalaureate degree and minimum one year's professional experience.
- Semesters of entry: summer and fall.

Requirements for Degree.

- Credit hours: 36.
- Required courses: consult program announcement available in department office.
- Study list: to be submitted by end of first semester.
- Credit limitations: EdLF 515R or extension credit will not be counted toward a degree program.
- Thesis and/or comprehensive examination: required upon completion of course requirements.

Requirements for Minimum

Registration. Following admission to the MEd program, students will be expected to work continuously toward completion of all requirements for the degree. The university requires that students complete at least 6 semester hours of approved program credit during each academic year (September 1 to August 31). Students are permitted five years to

complete the degree program and graduate.

Requirements for Administrative/Supervisory Endorsement in Addition to Master's Degree. To become a school site administrator, and for certain district office positions in Utah, the Administrative/Supervisory endorsement is required. The Administrative/Supervisory endorsement, which is an endorsement to the teaching certificate, requires prior teaching experience and the completion of courses and credits beyond the 36 hours for the master's degree. Students wishing to receive the endorsement must have prior approval.

Educational Leadership—EdD

The doctor of education program provides graduate students with scholarly learning experiences that will enable them to become superb educational leaders. To accomplish this purpose, the department admits graduate students who have the potential to become leaders with vision and wisdom and who can influence the educational enterprise.

The EdD has three elements: first, core and elective courses presumed to expand the knowledge base required for good leadership in contemporary educational settings; second, an examination that allows the student to demonstrate the ability to integrate and synthesize ideas learned from various courses; third, a dissertation, emphasizing the application of theoretical constructs to educational policies and practices. For specific details on acceptable types of dissertations, please refer to the current EdD program announcement.

Admission and Entry.

- Semesters of entry and application deadlines: all application materials must be completed and on file in the Office of Graduate Studies by January 15 of each year to be considered for admission to graduate study the coming summer term.
- Doctoral applicants must contact the department secretary no later than October 15 of the year preced-

ing intended entry to obtain materials specific to application procedures and deadlines.

- Doctoral students enter the university to begin study only in the summer term of each year.
- Required entrance examinations: the GRE or LSAT; and, for international applications, TOEFL. The department may require additional examinations.
- Prerequisite: master's degree or equivalent; minimum of three years' professional experience in a leadership position related to education.

Requirements for Degree.

- Credit hours (90): minimum 78 course work hours plus 12 hours of dissertation (EdLF 799R); minimum 42 hours taken in the BYU doctoral program. Credit earned in an accredited advanced degree program such as a master's or educational specialist degree may apply on the recommendation of the graduate advisor.
- Required core courses: see program announcement available in department office.
- Study list: submit by the end of the first semester.
- Credit limitations: EdLF 515R or extension credit will not be counted toward a degree program.
- Residence: two consecutive semesters (at least 6 hours each) on the BYU Provo campus.
- Examinations: (A) comprehensive examination of course work, (B) oral presentation of dissertation.
- Dissertation: a rigorous, independent, guided research project. The EdD dissertation (12 credit hours) may not be undertaken until all course work has been completed, the comprehensive examination has been passed, and the student is enrolled in EdLF 795. The dissertation is different from course work per se; therefore, performance on the dissertation may not correlate with performance in individual courses.

Minimum Registration. Following admission to the doctoral program, students will be expected to work

continuously toward completion of all requirements for the degree. The university requires that students complete at least 6 hours of approved program credit during each academic year (September 1 to August 31). Students are permitted eight years in which to complete the degree program and graduate.

Educational Leadership—PhD

This degree program prepares students for (A) school leadership, (B) scholarly inquiry and teaching, and (C) research in the education process. Applicants should have a high interest and aptitude for research and inquiry and commit themselves to a minimum one year of full-time study on campus. It is expected that a portion of the student's study time will involve collaborative research and inquiry with selected faculty members.

The PhD has three elements: first, core and elective courses presumed to expand the knowledge base required for good leadership in contemporary educational settings; second, an examination that allows the student to demonstrate the ability to integrate and synthesize ideas learned from various courses; third, a dissertation, emphasizing the application of theoretical constructs to educational policies and practices. For specific details on acceptable types of dissertations please refer to the current PhD program announcement.

Admission and Entry.

- Semesters of entry and application deadlines: all application materials must be completed and on file in the Office of Graduate Studies by January 15 of each year to be considered for admission to graduate study the coming summer term.
- Doctoral applicants must contact the department secretary no later than October 15 of the year preceding intended entry to obtain materials specific to application procedures and deadlines.
- Doctoral students enter the university to begin study only in the summer term of each year.

- Required entrance examinations: the GRE or LSAT; and, for international applicants, TOEFL. The department may require additional examinations.
- Prerequisite: master's degree or equivalent; minimum of three years' professional experience in leadership and/or administration consistent with intended area of study.

Requirements for Degree.

- Credit hours (96): minimum 78 hours beyond the baccalaureate degree plus 18 hours of dissertation credit (EdLF 799R); minimum of 42 hours taken in the BYU doctoral program. Credit earned in an accredited advanced degree program may apply on the recommendation of graduate advisor.
- Required core courses: see program announcement available in department office.
- Study list: submit by the end of the first semester.
- Credit limitations: EdLF 515R or extension courses will not be counted toward degree programs.
- Minor: 12 hours in a department outside the McKay School of Education.
- Residence: two consecutive full-time semesters (9 hours each semester) on the BYU Provo campus.
- Examinations: (A) comprehensive examination of course work (B) oral presentation of dissertation.
- Dissertation: a rigorous, independent, guided research project. The dissertation (18 credit hours) presumes advanced research expertise and may not be undertaken until all course work has been completed, the comprehensive examination has been passed, and the student is enrolled in EdLF 795. The dissertation is different from course work per se; therefore, performance on the dissertation may not correlate with performance in individual courses.

Minimum Registration. Following admission to the doctoral program, students will be expected to work continuously toward completion of

all requirements for the degree. The university requires that students complete at least 6 hours of approved program credit during each academic year (September 1 to August 31). Students are permitted eight years in which to complete the degree program and graduate.

FINANCIAL ASSISTANCE

Research Assistantships. A limited number of research assistantships are available for full-time students. These assignments involve working with selected faculty members on a ten- to twenty-hour-per-week basis. Assistantships are given for a one-year period only but may be extended following a review of student performance.

Tuition Waivers. Waivers are available on a limited basis. Students receiving assistantships are not normally given tuition waivers. Tuition aid is given on the basis of need, and applications should be received in the department by May of each year for consideration for the following summer term and academic school year.

Scholarships. Several modest scholarships are also available. Contact the department for application forms and additional information about these opportunities.

RESOURCES AND OPPORTUNITIES

Computer Laboratory. Computer terminals in the laboratory provide graduate students direct line access to the university's large mainframe computers, enabling students to use several sophisticated programs, such as SPSS and SAS, to analyze research data. These terminals also enable students to search out books and other materials in the Harold B. Lee Library.

Graduate Student Project and Research Laboratory. Laboratory space is provided for graduate students who are working with faculty on research, evaluation, and development projects.

Study Areas. Graduate study areas are available in the McKay School of Education Learning Resource Center.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

Note: EdLF 515R is for teacher certification purposes only and is listed in the BYU Undergraduate Catalog.

530. School and Community Programs in Education. (2)

Examination of programs in school and community for enhancement of teaching and learning.

600. Leadership: The Human and Organizational Domains. (3)

Leadership and organization behavior, theories, and research in educational settings.

602. Leadership and Change Processes in the School. (3)

Change processes in educational institutions.

609. The School Principal. (3)

Work of the principal in public schools: instructional leadership, personnel relationships, supervision, and administration.

610. Human Resource Development in Education. (2)

Introduction to human resource management policy and practice in education organizations, including job analysis and design, recruitment, selection, supervision, evaluation, and development.

614. Education of Diverse Populations. (3)

Problems, issues, and programs related to students with varying abilities, interests, and needs.

617. Professional and Scholarly Communication in Education. (3)

Developing and refining skills in written and oral communication. Analytical, critical, and persuasive writing; speaking, presenting, and collaborative problem solving.

620. Educational Finance. (3)

Theory, principles, and general practices of public school finances; equalization and finance problems.

622. The Law and Education. (3)

Evolution of American law and its application to American educational systems. Fundamental sources and principles of the law, the judicial structure, and key court cases affecting education at the state and federal levels.

629. Instructional Leadership in Schools. (3)

Alternative approaches to instructional leadership in schools, emphasizing problems of curriculum, supervision, and designing and implementing school improvement programs.

631. Teaching and Learning: Research and Practice. (2)

Teaching and learning from the perspectives of research, practice, and theory.

632R. Field Practicum. (2-6)

Working with a school administrator as a supervised intern (6 hours required for administrative certificate; 2 hours required for MEd degree).

634R. Doctoral Internship. (1-6)

Prerequisite: EdLF 610, 612, 628.

Field experience in state office and local school districts, community colleges, and other agencies.

635R. Internship Seminar. (1-3)

School administrative internship seminar. Practices, concepts, and theories of school administration.

650. Education Policy Analysis. (3)

Evaluation of educational policy in such domains as equity, resource allocation, productivity, assessment, curriculum, and governance.

655. Social History of American Education. (3)

Interpretative study of major ideas, values, and practices that influenced development of American education within broader social, political, cultural, and economic context.

658. Political Aspects of Education. (2)

Understanding processes and institutions in building support for education; associated issues.

659. Contemporary Issues in Educational Leadership. (2)

Developing problem-solving skills in understanding and resolving educational issues affecting schools.

662. International Comparative Education. (3)

Contrasting external educational practices operating in the U.S. with school organizational practices in other countries.

663. International Development Education. (3)

Issues related to the socioeconomic and cultural context of educational planning in less developed countries. Selected global and cross-cultural issues related to education as a tool for national development.

665. Evaluation and Assessment of School Programs. (3)

Nature, purpose, and function of evaluating educational programs.

668. Philosophical Foundations of Western Education. (3)

Major philosophies of education from idealism to postmodernism and their influence on educational theory and practice.

670R. Workshops in Educational Leadership. (1-3)

Prerequisite: EdLF 610, 612.

672. Research Methods. (3)

Techniques of research in educational settings.

674. Business Administration and Technology Applications in Education. (2)

Organizing and managing business affairs in educational institutions. Business and instructional applications of technology in education.

694R. Independent Study. (1-3)

Prerequisite: departmental consent if more than one registration desired.

Study experience in an area of specialization under direction of a faculty member.

695R. Independent Research. (1-3)

Prerequisite: instructor's consent; departmental consent if more than one registration desired.

Individual research study or project under the direction of a faculty member.

699R. Master's Thesis. (1-6)

Prerequisite: committee chair's consent.

700. Educational Leadership. (3)

Theories of leadership in educational settings.

720. Educational Policy and Analysis for School Leaders. (3)

Prerequisite: EdLF 658, 668.

Conceptual and practical issues in formulating, implementing, and evaluating educational policy.

762. History of Higher Education. (3)

Historical review of challenges facing higher educational administration in today's colleges and universities.

775. Educational Research: Theory and Methodology. (3)

Prerequisite: Stat 510, EdLF 672; or equivalents.

Exploration of the history, theory, and methodology of research in education.

776. Contemporary Approaches to Educational Research. (3)

Prerequisite: EdLF 672 or equivalent; 775.

Exploration of the paradigms and approaches to contemporary educational research.

780. Economic Issues in Educational Leadership. (3)

Economic benefits of education to country's economy; why education is considered an investment in human capital. Equity and equality of funding education.

782. Constitutional Law and Education. (3)

Prerequisite: EdLF 622 or instructor's consent.

Impact of Constitution on education in America; cases under constitutional law that have influenced policy and practice in the educational system.

788R. Doctoral Practicum. (1-3)

Designing and implementing on-site research. Development of doctoral prospectus under direction of a faculty member.

791R. Doctoral Seminar. (1-3)

Prerequisite: departmental consent.

792. Research Topics and Issues in International Comparative Education. (3)

Research topics and issues on histories, philosophies, and practices of international educational systems.

795. Research and Reporting Techniques for Doctoral Dissertation. (3)

Research designs for planning and conducting research for doctoral dissertation using survey, inferential, and experimental methods.

799R. Dissertation. (1-18)

Prerequisite: EdLF 795.

FACULTY

FERRIN, SCOTT E., *Assistant Professor*. JD, Brigham Young University, 1984; EdD, Harvard University, 1996. School Law, Policy, Politics.

GIBB, SHARON A., *Assistant Professor*. EdD, Brigham Young University, 1992. School Improvement; Instructional Leadership.

HITE, STEVEN J., *Associate Professor*. EdD, Harvard University, 1985. Research Theory and Methodology.

HOLSINGER, DONALD B., *Professor*. PhD, Stanford University, 1972. International and Comparative Education, Development Sociology of Education.

MATTHEWS, L. JOSEPH, *Associate Professor*. EdD, Brigham Young University, 1987. Leadership; Educational Administration; Principalship.

MAYES, CLIFFORD T., *Assistant Professor*. PhD, University of Utah, 1997. Cultural Foundations; Sociology of Education.

PATTERSON, ROBERT S., *Professor*. PhD, Michigan State University, 1968. History and Philosophy of Education.

PETERSON, ERLEND D., *Assistant Professor*. EdD, Brigham Young University, 1985. Higher Education.

RANDALL, E. VANCE, *Associate Professor*. PhD, Cornell University, 1989. Educational Administration; Philosophy and Public Policy Analysis.

RICHARDS, A. LEGRAND, *Associate Professor*. PhD, Brigham Young University, 1982. Philosophy; Foundations.

VAN ALFEN, CURTIS N., *Professor*. EdD, University of Utah, 1967. Leadership; Higher Education; Change in Education.

WASDEN, F. DEL, *Professor*. EdD, Brigham Young University, 1971. Law; Leadership; Administration.

WEBB, CLARK D., *Associate Professor*. PhD, University of Texas, Austin, 1970. Instruction; Writing; Leadership.

WILLARDSON, J. D., *Assistant Professor*. EdD, University of Southern California, 1987. Finance; Politics.

ELECTRICAL AND COMPUTER ENGINEERING

Chair: Richard L. Frost

Graduate Coordinator: Michael Rice

459 CB

Provo, UT 84602-4099

(801) 378-4012

E-mail: grad@ee.byu.edu

THE PROGRAM OF STUDIES

Electrical engineering has its origins in the study and application of electrical phenomena. However, in recent years the field has grown to embrace a diverse range of problems in applied physics and mathematics. The department currently offers advanced study in four broad areas.

- *Computer engineering* concentrates on the architecture and implementation of digital logic and computing systems.
- *Electromagnetics* explores the theory, physical properties, and applications of electromagnetic radiation and includes emphases in optics, remote sensing, and numerical computation.
- *Microelectronics and VLSI* focuses on the design and fabrication of micro-electronic circuits for digital and analog applications, including device physics, modeling, processing, and fabrication.
- *Signals and systems* studies fundamental and applied issues in information processing and includes emphases in communication theory, linear and nonlinear control systems, digital signal processing, and estimation theory.

Specific research activities in these broad areas are described on the department World Wide Web page at <http://www.ee.byu.edu>.

Two degrees are offered through the department: Electrical Engineering—MS and Electrical Engineering—PhD.

Admission and Entry.

All degree programs have the same admission and entry requirements.

- Semesters of entry and application deadlines: fall, February 15; winter, September 15.
- Application requirements: complete BYU Application for Admission to Graduate Study forms and GRE general exam (for all applicants with BS degree from non-ABET- accredited program).
- Prerequisites: BS degree in electrical or computer engineering or allied discipline. Minimum 3.0 GPA for last 60 credit hours of course work.

Electrical Engineering—MS

The MS degree concentrates on establishing a sound theoretical foundation and on exposing students to advanced developments. The critical thinking and high level of mathematical and algorithmic facility required by the abstract nature of graduate courses allows the MS graduate to assume responsibility and supervision beyond that normally given a BS engineer. MS students study in one of the four broad areas while pursuing either the course work or thesis option. The breadth of the course work degree provides professional leadership necessary to remain current in this rapidly changing field. The focus of the thesis degree develops the research and design tools necessary to participate in the leading edge developments in the discipline. The MS degree typically takes from one to two years to complete.

Requirements for Degree (Course Work Option).

- Credit hours: 30
- Required courses: 9 credit hours from one of the four emphasis areas and 6 credit hours from any of the other three emphasis areas.
- Study list: submitted during first semester of graduate study.

Requirements for Degree (Thesis Option)

- Credit hours: 30.
- Required courses: 9 credit hours from one of the four emphasis areas and 3 credit hours from one of the other three emphasis areas; ECEn 699R.

- Study list: submitted during first semester of graduate study.
- Thesis.
- Final oral examination consisting of public presentation of original research described in thesis.

Engineering Management—Minor

Offered to MS students in the College of Engineering and Technology, the engineering management minor provides a way to include some elements of modern management in a technical graduate program.

Requirements.

- The minor requires 9 hours selected from the following courses: Mgt 501, 511, 541, 561, 562, 565, 580, or approved Marriott School graduate courses..
- Students should carefully plan how they will meet the requirements of the minor since these courses are taught only once a year.

This minor should be declared as part of a student's graduate study list. Admittance approval to enroll in class will be derived from approved graduate study lists.

Electrical Engineering—PhD

The engineering PhD student collaborates with a faculty advisor on a topic that may have a lasting influence on theoretical understanding or on professional practice. Although courses on advanced topics in one of the four areas of emphasis are taken, the PhD is primarily a research experience that requires an ability to identify, investigate, formulate, and solve new problems of interest. The results of this exercise are reported in a dissertation and in the research literature. Careers for PhD graduates are characterized by the expectation to act with considerable independence and to assume major responsibilities. The PhD graduate is prepared for a wide range of career choices in industry, government agencies, and academia.

Requirements for Degree.

- Credit hours (54): 36 hours of course work beyond the baccalaureate degree plus 18 hours of dissertation (ECEn 799R).
- Required courses: 36 credit hours of graduate course work as specified by the advisory committee; ECEn 799R.
- Study list: submitted during first year of graduate study.
- Comprehensive examination: written and oral portions completed by end of second year.
- Advancement to candidacy.
- Dissertation prospectus.
- Dissertation.
- Final oral examination consisting of public presentation of original research described in dissertation.

FINANCIAL ASSISTANCE

The department provides as much financial assistance to graduate students as is available within departmental and university guidelines. More information may be obtained from the department. The following types of financial assistance are available to students who qualify:

Tuition Waivers. The department offers a limited number of full and partial tuition waivers on a competitive basis. All graduate students in good standing may apply for these waivers.

Teaching / Research Assistantships. A limited number of teaching / research assistantships are awarded to full-time graduate students in good standing. These assistantships are renewable annual appointments that require the student to serve as a teaching assistant for two semesters and provide matching research funds in addition to tuition benefits. Students must commit to a research-oriented graduate program to qualify.

Research Assistantships. Full-time graduate students in good standing may be awarded research assistantships to assist faculty with externally funded research. Arrangements must be made with individual faculty members.

Fellowships. The department awards a limited number of research fellowships on a competitive basis to full-time graduate students in good standing.

RESOURCES AND OPPORTUNITIES

The department maintains a variety of facilities to support the diverse research efforts of the graduate faculty. Facilities include:

- Extensive PC and Unix workstation computer resources.
- Digital signal processing laboratory that includes a variety of software tools, image display and digitizing equipment, and audio processing equipment.
- Sound room to support research in audio signal processing.
- Well-equipped clean-room to support research in semiconductor and electro-optic fabrication.
- Microwave remote sensing laboratory.
- Electro-optics laboratory that includes lasers and fiber optic research equipment.
- Antenna range.
- Reconfigurable logic laboratory.
- Telemetry laboratory to support research in digital communications and error control coding.
- Control laboratory to support research in nonlinear control systems.

For a description of current research activities associated with each facility, see the department World Wide Web page at <http://www.ee.byu.edu>.

COURSE DESCRIPTIONS**522R. Special Topics in Computer Systems. (1-3)**

Prerequisite: instructor's consent.

523. Queuing Theory and Modeling Fundamentals. (3)

Prerequisite: ECEn 380 or concurrent registration; Stat 421.

Computer systems and network modeling using stochastic processes: queuing theory models, performance analysis, resource allocations, large-system response parameters.

524. Advanced Digital Systems. (3)

Prerequisite: ECEn 451; proficiency in C or C++.

Advanced synchronous systems design, CAD and HDL's, systolic arrays, high-speed, low-power digital circuit architectures.

526. Computer Internetworking. (3)

Prerequisite: ECEn 427 or equivalent.

Basics of computer networking, legacy and modern LANS, switches/routers, voice/data/video communications, lab experience with network routers and switches, performance evaluation.

528. Advanced Computer Architecture. (3)

Prerequisite: ECEn 428 or equivalent.

Lab experience with hardware and software techniques for exploiting instruction-level parallelism.

541. Active and Passive Filter Design. (3)

Prerequisite: ECEn 313, 380; or equivalents.

Design methods for electronic filters based on passive components, active components, and integrated circuit components.

542R. Special Topics in Electronics. (1-3)

Prerequisite: instructor's consent.

543. CMOS Analog Circuit Design. (3)

Prerequisite: ECEn 443 or 445 or equivalent.

Factors affecting performance of MOS devices in analog applications. Design of MOS amplifiers, buffers, and comparators.

550. Microelectromechanical Systems (MEMS). (3)

Prerequisite: ECEn 450 or MeEn 372 or equivalent.

Design, fabrication, and applications of microelectromechanical systems (MEMS). Mechanical properties governing design and reliability of MEMS and the processing technologies used to fabricate them.

551. VLSI Systems Design. (3)

Prerequisite: ECEn 451.

Design of structured circuit systems for very large-scale integrated semiconductor chips. Architecture of digital VLSI systems.

553. VLSI Process Technology. (3)

Prerequisite: senior or graduate standing in engineering or physical sciences.

Physical and chemical process steps used in fabricating very large-scale integrated circuits on monolithic silicon crystal.

560. Electromagnetic Wave Theory. (3)

Prerequisite: ECEn 460, 582.

Principles and methods of modern electromagnetic wave theory: anisotropic media, dyadic green functions, Nuygen's principle, contour integration methods, asymptotic integration. Applications in radiation and scattering.

561. High-Frequency Communication Circuits. (4)

Prerequisite: ECEn 443, 460.

Circuits and RF techniques used in communication systems.

562. Optical Communication Components and Systems. (3)

Prerequisite: ECEn 460 or equivalent.

Fiber-optic communication system components and their operating and performance characteristics.

563. Applied Computational Electromagnetics. (3)

Prerequisite: ECEn 460 or equivalent.

Current theory and practice in numerically solving Maxwell's equations for antenna and circuit design and radar-scattering prediction.

564. Radar and Communication Systems. (3)

Prerequisite: ECEn 460, 485; or equivalents.

Design and performance of radar and communication systems: radar equation ambiguity functions, modulation, signal detection, link budgets, spread spectrum, system design, and performance trade-offs.

568. Microwave Remote Sensing. (3)

Prerequisite: instructor's consent.

Emphasis on space-borne remote sensing of earth's atmosphere, land, and oceans. Primary methods and applications for both active (radar) and passive (radiometry).

580. Stochastic Processes. (3)

Prerequisite: ECEn 380 or equivalent; Stat 421 or equivalent; graduate standing or instructor's consent.

Review of elementary probability, introduction to random processes: definitions, properties, covariance, spectral density, time average, stationarity, ergodicity, linear system relations, mean square estimation, Markov processes.

581. Detection and Estimation Theory. (3)

Prerequisite: Stat 421 or equivalent; graduate standing or instructor's consent.

Sufficiency, completeness; Neyman-Pearson and Bayes detector; maximum likelihood, Bayes, minimum mean square, and linear estimation; Kalman filters; selected topics.

582. Mathematics of Electrical Engineering. (3)

Prerequisite: ECEn 380, Math 343 (or equivalents); graduate standing or instructor's consent.

Introduction to mathematics of signal processing, communication, and control theory; linear spaces, Eigenvalue and singular value decompositions, quadratic forms, linear operators, adjoints, dual spaces.

621. Computer Arithmetic. (3)

Prerequisite: ECEn 524.

Fundamental principles and development of algorithms for performing arithmetic on digital computers and application-specific processors.

624. Regular Array Architectures. (3)

Prerequisite: ECEn 524.

Theory, design, and applications of regular array architectures and systolic arrays.

625. Compilation Strategies for High-Performance Systems. (3)

Prerequisite: ECEn 524.

Compilation and synthesis strategies for high-performance hardware/software systems.

629. Reconfigurable Computing Systems. (3)

Prerequisite: ECEn 524.

Introduction to FPGA devices, lab experience developing FPGA-based configurable systems.

662R. Special Topics in Electromagnetics. (1-3)

Prerequisite: graduate standing or instructor's consent.

682R. Special Topics in Signals and Systems. (1-3)

Prerequisite: graduate standing or instructor's consent.

683. Linear System Theory. (3)

Prerequisite: ECEn 483, 582.

Mathematical introduction to time-varying linear systems; state space descriptions, controllability, observability, Lyapunov stability, observer-based control. Design of linear quadratic regulators and infinite horizon Kalman filters.

685. Error-Control Coding. (3)

Prerequisite: graduate standing or instructor's consent.

Theory and implementation of block and convolutional codes for error control in digital communications and computer applications. Cyclic codes, CRCs, BCH, Reed-Solomon, Viterbi algorithm.

687. Digital Signal Processing. (3)

Prerequisite: ECEn 487, 580; graduate standing or instructor's consent.

Advanced theory and applications including optimal statistical processing, adaptive processing, and array processing methods.

688. Digital Image Processing. (3)

Prerequisite: ECEn 487, 580; graduate standing or instructor's consent.

Digital processing theory and techniques for two-dimensional image analysis, enhancement, restoration, data compression, and reconstruction from projections.

689R. Advanced Topics in Signals and Systems. (3)

Subjects that may be offered include:

- Information Theory
- Optimal Estimation Theory
- System Identification
- Advanced Image Processing
- Pattern Recognition

699R. Master's Thesis. (1-9)

Prerequisite: graduate standing and major professor's consent.

794R. Selected Topics in Electrical and Computer Engineering. (1-3)

797R. Research for Doctoral Students. (1-9)

799R. Doctoral Dissertation. (1-9)

FACULTY

ARCHIBALD, JAMES K., *Associate Professor*. PhD, University of Washington, 1987. Computer Architecture; Parallel Processing.

ARNOLD, DAVID V., *Assistant Professor*. PhD, Massachusetts Institute of Technology, 1992. Electromagnetic Wave Theory.

BEARD, RANDAL, *Assistant Professor*. PhD, Rensselaer Polytechnic Institute, 1995. Nonlinear System Theory; Control Theory.

BEARNSON, LEROY WOOD, *Associate Professor*. PhD, Auburn University, 1970. Computer Communication; Error Correction; Networking.

CHABRIES, DOUGLAS M., *Professor*. PhD, Brown University, 1970. Digital Signal Processing; Adaptive Filtering; Image and Sonar Processing.

CHRISTIANSEN, RICHARD, *Professor*. PhD, University of Utah, 1976. Digital Signal Processing.

COMER, DAVID JOHN, *Professor*. PhD, Washington State University, 1966. Electronics; Circuit Theory.

FROST, RICHARD L., *Associate Professor*. PhD, University of Utah, 1979. Digital Signal Processing; Information Theory; Image Processing; Neural Networks.

HUTCHINGS, BRAD L., *Associate Professor*. PhD, University of Utah, 1992. Reconfigurable Logic; FPGA's VLSI Design.

JEFFS, BRIAN D., *Associate Professor*. PhD, University of Southern California, 1989. Digital Signal Processing; Digital Image Processing; Biomedical Imaging.

JENSEN, MICHAEL, *Assistant Professor*. PhD, University of California, Los Angeles, 1994. Numerical Methods in Electromagnetics; Antenna Theory.

LONG, DAVID G., *Associate Professor*. PhD, University of Southern California, 1989. Microwave Remote Sensing; Estimation Theory; Radar.

NELSON, BRENT E., *Professor*. PhD, University of Utah, 1984. VLSI Design; Computer Systems Design.

RICE, MICHAEL, *Associate Professor*. PhD, Georgia Institute of Technology, 1991. Digital Communication Theory; Error-Control Coding; Satellite Communications.

SELFRIDGE, RICHARD H., *Associate Professor*. PhD, University of California, Davis, 1984. Fiber and Integrated Optics; Electromagnetics; Lasers.

SMITH, KEVIN B., *Assistant Professor*. PhD, Ohio State University, 1996. Metrology; Robotics; Controls.

STIRLING, WYNN C., *Professor*. PhD, Stanford University, 1983. Linear System Theory; Estimation and Detection Theory; Control Theory.

SWINDLEHURST, ARNOLD LEE, *Associate Professor*. PhD, Stanford University, 1991. Estimation Theory; Signal Processing; Controls.

WILDE, DORAN, *Associate Professor*. PhD, Oregon State University, 1995. Regular Array Architectures; Computation.

WIRTHLIN, MICHAEL, *Assistant Professor*. PhD, Brigham Young University, 1997. Computer System Design and Performance.

ENGINEERING MANAGEMENT

Engineering Management—Minor

Offered to MS students in the College of Engineering and Technology, the engineering management minor provides a way to include some elements of modern management in a technical graduate program.

Requirements

- The minor requires 9 hours selected from the following courses: Mgt 501, 511, 541, 561, 562, 580, or approved Marriott School graduate courses.
- Students should carefully plan how they will meet the requirements of the minor since these courses are taught only once a year.

This minor should be declared as part of a student's graduate study list. Admittance approval to enroll in class will be derived from approved graduate study lists.

Following are descriptions of courses.

COURSE DESCRIPTIONS

Mgt 501. Managerial Accounting. (3)

Nature, objectives, and procedures of cost accounting. Topics include job costing, joint product costing, cost behavior analysis, standard costs, problems of cost allocation, and uses of cost data in decision making.

Mgt 511. Managerial Finance. (3)

Financing problems facing a business: managing working capital and long-term assets; financing capital requirements in the short and long term; techniques of financial analysis and planning; identifying and valuating cash flows; cost of capital; capital budgeting, structure, and markets; raising corporate capital.

Mgt 541. Marketing Management. (3)

Development of analytical marketing tools and techniques and their utilization in case analysis and decision making in marketing management.

ENGLISH

Chair: John S. Tanner
Graduate Coordinator: Richard Duerden

3110 JKHB
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 (801) 378-8673

THE PROGRAM OF STUDIES

The English Department, as a part of the College of Humanities, offers graduate study devoted to the development of reading, writing, and thinking abilities derived from studying and producing literary and other texts in English. Students study these works in aesthetic, historical, religious, and other contexts, including the theoretical contexts the faculty bring to the courses they teach. This program makes intensive use of the library and its resources.

The English MA program enables students to develop knowledge, skills, and attitudes that have application in contemporary society and that are in harmony with the principles of the restored gospel of Jesus Christ.

The program may appeal to students who plan to enter such careers as teaching, editing, and writing; to those who seek an advanced liberal arts degree for preparation in library science or public service; to those who plan to go on for a doctorate in English or a related area; and to those who wish to continue studies for personal satisfaction.

One degree is offered through the Department of English: English—MA.

Each year there are approximately 100 students in the English MA program. The average duration for the degree is two years.

English—MA

The MA degree in English offers course work beyond the bachelor's degree in seven areas of emphasis: American Literature, Creative

Writing, English Literature (Beginning to 1800), English Literature (1800 to Present), Language, Other Literature (Folklore and Ethnic), or Rhetoric.

Admission and Entry.

- Semesters of entry and application deadlines: fall, January 15 (U.S. and international).
- Application requirements: application, including writing sample.
- Entrance examination: GRE general exam is required. (GRE advanced literature subject test is optional.)
- Prerequisite: undergraduate major or its equivalent, one course in literary criticism (Engl 351 or 352 or equivalent), one course in the history of the English language (Engl 324 or equivalent), and reading knowledge of one foreign language.

Requirements for Degree.

- Credit hours: 31 minimum, consisting of 25 course work hours plus 6 thesis hours (Engl 699R).
- Core requirement (10 hours): Engl 600 (1); Engl 610 or, with approval, a rhetoric section of Engl 521R (3); Engl 620 or, with approval, Engl 527, 528, 529, 624, or 626 (3); Engl 630 or, with approval, Engl 650R (3).
- Emphasis: 9 hours of course work in an approved area of emphasis beyond the core that will support 6 hours' work on thesis. The emphasis must constitute a coherent body of study in an area the faculty can support. Areas of emphasis are American Literature, Creative Writing, English Literature (Beginning to 1800), English Literature (1800 to Present), Folklore and Ethnic Literature, Language, Rhetoric. Courses with in an emphasis are proposed by the student and approved through appropriate departmental process.
- Electives: 6 hours of approved study outside the core and area of emphasis.
- Limitation on individual readings courses: no more than 3 hours of individual readings (Engl 590R)

may be applied to the minimum 25 hours of course work.

- Thesis: 6 hours of 699R on a topic demanding research and analysis; or, for those with creative writing as their approved emphasis, a substantial creative work.
- Examination: examination on thesis, related course work in emphasis, and an approved reading list related to emphasis.

FINANCIAL ASSISTANCE

Financial assistance is available for this program through the English Department and other agencies in the university. However, the English Department does not offer its own scholarships.

Admitted students are encouraged to apply for instructorships, teaching and research assistantships, editing internships, and other awards that are provided as a financial and learning resource. The university makes some money available each year for tuition awards and handles federal student loans.

RESOURCES AND OPPORTUNITIES

The Department of English utilizes the **Humanities Research Center**. This center is especially active in the production of teaching and research materials, particularly those that are computer related.

The **Center for the Study of Christian Values in Literature** was established in 1980 to affirm the importance of religious and moral values in the creation and study of imaginative literature. It provides both a focus for activity and an encouragement to teachers, writers, scholars, and readers who believe in a value-centered literary tradition.

The **Reading-Writing Center** is available to assist students and faculty in improving their reading and writing skills. Graduate students benefit particularly from critical evaluations of drafts of seminar papers and theses, and those with

advanced reading and writing skills may serve as interns in the center.

Faculty research interests are included in the faculty section following the course descriptions.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500R. Eminent American Writers. (1-3)

Different writers each semester.

510R. Eminent English Writers. (1-3)

Different writers each semester.

515R. Advanced Scholarly Writing. (3)

Workshop for potential graduate students, graduate students, and professionals in all disciplines in preparing the thesis, dissertation, book chapter, and article.

516. Advanced Technical Writing. (3)

Prerequisite: Engl 316 or instructor's consent.

Advanced concepts, including literature of technical writing, liaison with technical staff, communication networks, rhetoric of graphics, and teaching and freelancing technical writing.

518R. Advanced Creative Writing. (3)

Prerequisite: Engl 318R, 319R, or instructor's consent.

Writing fiction, poetry, drama, and the essay; individual consideration of manuscripts; professional orientation. May be repeated for credit with departmental approval.

520R. Studies in Theme and Form. (1-3)

Topics vary: literature and film, myth and archetype, science fiction, etc.

521R. Studies in Language and Rhetoric. (1-3)

Prerequisite: Engl 324.

Topics vary with instructor.

527. Early Modern English. (3)

Prerequisite: Engl 223, 324.

English language from about 1500 to 1800, with special emphasis on the language of Shakespeare and the King James Bible.

528. Varieties of English. (3)

Prerequisite: Engl 223, 324.

Regional and social variation in English, especially standard and nonstandard national and world Englishes, including English-based pidgins and creoles.

529. Structure of Modern English. (3)

Prerequisite: Engl 328, Ling 325, or instructor's consent.

English syntax through modern grammars; theories underlying those grammars.

590R. Individual Readings in English. (1-3)

Prerequisite: graduate coordinator's consent.

Language and/or literature beyond what is offered in the curriculum. May not be substituted for another catalog course.

599R. Academic Internship. (1-9)

Prerequisite: department chair's consent.

On-the-job training.

600. Introduction to Graduate Studies. (1)

Trends in postgraduate curricula, ideology, pedagogy, and professional publication in language and literature.

610. Rhetoric and Composition. (3)

Theory and methods of teaching rhetoric and composition; emphasis on rhetoric's relationship to the study of literature and language. (Required of all graduate student instructors.)

612. History of Rhetoric. (3)

Major texts, thinkers, and movements of the Western rhetorical tradition from classical antiquity to the present.

614. Theory of Rhetoric and Composition. (3)

Prerequisite: Engl 610.

Rhetorical theory and its relationship to current issues in rhetoric and composition.

616. Research in Rhetoric and Composition. (3)

Prerequisite: Engl 610.

Research methods in rhetoric and composition; evaluation of assumptions, strengths, and limitations of each method; identification of student research topics.

620. Language and Literature. (3)

Literature from a language perspective; applying linguistic constructs to literary language; examining literary style; linguistic analysis of unfamiliar texts.

624. Old English. (3)

Old English grammar and vocabulary; traditional syntactical patterns in various types of Old English prose and poetry.

625. Beowulf. (3)

Prerequisite: Engl 624.

Close reading of the poem in the original, emphasizing literary and cultural values.

626. Middle English. (3)

Detailed study of the principal dialects as illustrated in the literature of the period.

630. Theoretical Discourse. (3)

Modes of criticism: how to analyze assumptions, methods, and interpretations; how theory relates to practice; how to manage conflict among theories.

631. Studies in the English Novel. (3)

Analysis of literary values and techniques in selected novels.

635. Studies in the American Novel. (3)

Various approaches to the novel.

641. Studies in Drama. (3)

Intensive study of drama.

650R. Studies in Literary Criticism. (3)

Modern critical theory and practice applied to specific literary works.

655. Women's Textual Studies. (3)

Ways feminist critical insights affect the study of language, literature, and culture.

658R. Ethnic, Regional, and Other Literatures in English. (3)

Emphasis varies with instructor.

661. Studies in Early American Literature. (3)

Texts from times of the English settlement through the early 1800s.

662. Studies in Early Nineteenth-Century American Literature. (3)

Texts from the early 1800s through midcentury, with special attention to romanticism in America.

664. Studies in Late Nineteenth-Century American Literature. (3)

Texts from the middle through the end of the nineteenth century, with special attention to realism in America.

665. Studies in Early Twentieth-Century American Literature. (3)

Texts, trends, and writers from 1900 to midcentury.

666. Studies in Late Twentieth-Century American Literature. (3)

Texts, trends, and writers from the end of World War II to the present.

667. Studies in Folklore. (3)

Prerequisite: Engl 391 or instructor's consent.

Directed study in folklore and folkways, including Mormon heritage and tradition. Collecting, analyzing, and editing.

669R. Teaching English in the Secondary Schools. (2)

Prerequisite: Engl 377 or instructor's consent.

Literature, writing, language, and reading materials appropriate to English courses; effective use of these materials.

671. Studies in English Medieval Literature. (3)

Close reading in the original of a principal work, such as *Troilus and Cryseyde*, *Piers Plowman*, or *Sir Gawain and the Green Knight*, emphasizing its relation to other literature, culture, and history of the period.

672. Studies in English Renaissance Literature. (3)

Individual authors, styles, influences, and trends in sixteenth- and seventeenth-century English literature.

673. Studies in English Classicism. (3)

Selected writers from 1660 to 1780.

674. Studies in English Romanticism. (3)

Selected writers and trends from 1780 to 1832.

675. Studies in Victorian Literature. (3)

Literary genres, values, and techniques in representative works from 1832 to 1890.

676. Studies in Modern British Literature. (3)

Selected authors and works from 1890 to 1950.

680. Studies in Contemporary Literature. (3)

Specific trends in literature and criticism since midcentury.

682. Studies in Shakespearean Scholarship and Criticism. (3)**699R. Master's Thesis. (Arr.)****FACULTY**

BAKER, ROGER G., *Associate Professor*. EdD, Brigham Young University, 1977. Bible as Literature; Composition.

BALLANTYNE, VERDON W., *Associate Professor*. MA, Brigham Young University, 1964. American Literature; Technical Writing.

BALTES, PAUL J., *Assistant Professor*. PhD, Purdue University, 1995. Linguistics; Rhetoric and Composition; Humor Studies.

BENNION, JOHN S., *Associate Professor*. PhD, University of Houston, 1989. Creative Writing; British Novel; Mormon Literature.

BOSWELL, GRANT M., *Associate Professor*. PhD, University of Southern California, 1985. Rhetorical Theory and History; Composition Theory.

BURTON, GIDEON O., *Assistant Professor*. PhD, University of Southern California, 1994. History of Rhetoric; Renaissance Literature; Mormon Criticism and Literature.

CHAPMAN, DON E., *Assistant Professor*. PhD, University of Toronto, 1995. Old English Language and Literature; History of the English Language; Medieval Literature.

CHRISTIENSEN, NANCY L., *Assistant Professor*. PhD, University of California, Los Angeles, 1994. History and Theory of Rhetoric; Sixteenth-Century English Literature.

CLARK, GREGORY, *Professor*. PhD, Rensselaer Polytechnic Institute, 1985. Rhetorical Theory and Criticism; Early American Literature.

COWLES, DAVID L., *Associate Professor*. PhD, University of Chicago, 1985. Victorian Literature; English Novel; Literary Theory and Criticism.

CRACROFT, RICHARD H., *Professor*. PhD, University of Wisconsin, Madison, 1969. Nineteenth-Century American Literature; Literature of the American West.

CRISLER, JESSE S., *Professor*. PhD, University of South Carolina, 1973. Nineteenth-Century American Literature; Naturalism; Adolescent Literature.

CRONIN, GLORIA L., *Professor*. PhD, Brigham Young University, 1980. Twentieth-Century American Literature; Jewish American Literature; Nineteenth- and Twentieth-Century Women's Literature.

CROWE, CHRISTOPHER E., *Professor*. EdD, Arizona State University, 1986. English Education; Adolescent Literature.

- CUTCHINS, DENNIS R., *Assistant Professor*. PhD, Florida State University, 1997. American Literature; Folklore.
- CUTLER, EDWARD S., *Assistant Professor*. PhD, University of California, San Diego, 1997. Nineteenth-Century American Literature.
- DUERDEN, RICHARD Y., *Associate Professor*. PhD, University of Chicago, 1989. Sixteenth- and Seventeenth-Century English Literature; Literary Theory.
- EGGINGTON, WILLIAM G., *Professor*. PhD, University of Southern California, 1985. Varieties of English; Contrastive Rhetoric; Language Policy.
- ELIASON, ERIC A., *Assistant Professor*. PhD, University of Texas, Austin, 1998. Folklore.
- FOX, JAY, *Professor*. PhD, Purdue University, 1971. Late Nineteenth- and Early Twentieth-Century British Literature; Literature and Film.
- GEARY, EDWARD A., *Professor*. PhD, Stanford University, 1971. Late Nineteenth- and Early Twentieth-Century British and American Literature; Nature Writing.
- GRIERSON, SIRPA T., *Assistant Professor*. PhD, University of Southern Mississippi, 1996. English Education; Reading and Educational Research.
- HANSEN, KRISTINE, *Associate Professor*. PhD, University of Texas, Austin, 1987. Rhetoric; Composition Theory.
- HARRIS, CLAUDIA W., *Associate Professor*. PhD, Emory University, 1990. Irish Literature; Modern and Contemporary Drama; Contemporary British Literature.
- HASSETT, MICHAEL J., *Assistant Professor*. PhD, Iowa State University, 1995. Rhetoric and Professional Communication.
- HATCH, GARY L., *Associate Professor*. PhD, Arizona State University, 1992. History and Theory of Rhetoric; Eighteenth-Century English Literature.
- HOWE, SUSAN, *Associate Professor*. PhD, University of Denver, 1989. Creative Writing; Contemporary American Poetry and Drama.
- HUGHES, DEAN T., *Associate Professor*. PhD, University of Washington, 1972. Creative Writing.
- HUNSAKER, O. GLADE, *Associate Professor*. PhD, University of Illinois, 1970. Seventeenth-Century British Literature; Milton; Shakespeare.
- JOHSTONEAUX, RAPHAEL, *Associate Professor*. PhD, George Peabody College for Teachers of Vanderbilt University, 1980. Modern American Literature; English Education.
- JORGENSEN, B. W., *Associate Professor*. PhD, Cornell University, 1978. Creative Writing; Nineteenth-Century American Literature; Contemporary American Fiction.
- LAMBERT, NEAL E., *Professor*. PhD, University of Utah, 1966. American Literature 1620-1860.
- LARSEN, LANCE E., *Assistant Professor*. PhD, University of Houston, 1993. Creative Writing; American Literature.
- LAWRENCE, A. KEITH, *Associate Professor*. PhD, University of Southern California, 1987. Early American Literature; Asian-American Literature.
- LUNDQUIST, SUZANNE E., *Associate Professor*. DA, University of Michigan, 1985. Native American Sacred Texts and Modern Novels; Third World Literature.
- MUHLESTEIN, DANIEL K., *Assistant Professor*. PhD, Rice University, 1992. Literary Theory; English Romantic Literature.
- MURPHY, JOHN J., *Professor*. MA, St. John's University, 1961. Nineteenth- and Early Twentieth-Century American Literature; Willa Cather.
- NELSON, JOYCE, *Associate Professor*. MS, Florida State University, 1971. English Education; Critical Reading.
- NORRIS, G. LESLIE, *Humanities Professor of Creative Writing*. MPhil, Southampton University, England, 1958. Creative Writing; English Romantic Literature.
- NORTON, DON E., *Assistant Professor*. MA, Brigham Young University, 1961. English Language; Usage.
- OAKS, DALLIN D., *Associate Professor*. PhD, Purdue University, 1990. English Linguistics; Structure of English; Old English Language.
- PARRY, CATHERINE CORMAN, *Associate Professor*. PhD, University of California, Los Angeles, 1985. Medieval English Language and Literature.
- PAUL, DANETTE, *Assistant Professor*. PhD, Pennsylvania State University, 1996. Rhetoric and Composition; Rhetoric of Science.
- PAXMAN, DAVID B., *Associate Professor*. PhD, University of Chicago, 1982. Eighteenth-Century English Literature; Intellectual History.
- PEDERSEN, ELRAY L., *Associate Professor*. PhD, University of Minnesota, 1977. English Education; Teaching of Writing.
- PETERSEN, ZINA N., *Assistant Professor*. PhD, Catholic University, 1997. Medieval English Studies; Women's Devotional Literature.
- PLUMMER, LOUISE R., *Assistant Professor*. MA, University of Minnesota, 1984. Creative Writing.
- RUDY, JILL T., *Assistant Professor*. PhD, Indiana University, 1997. Folklore.
- SIEGFRIED, BRANDIE R., *Assistant Professor*. PhD, Brandeis University, 1993. Sixteenth- and Seventeenth-Century English Literature; Women's Studies; Literary Theory.
- SKOUSEN, ROYAL, *Professor*. PhD, University of Illinois, 1972. Linguistics; Textual Criticism.
- SMITH, MARION K., *Associate Professor*. PhD, University of Texas, 1986. Technical Writing; American Literature; Science Fiction.
- SNYDER, PHILLIP A., *Associate Professor*. PhD, University of North Carolina, Chapel Hill, 1988. Twentieth-Century British and American Literature; Autobiography.

- SORENSEN, PETER J.**, *Associate Professor*. PhD, Washington State University, 1988. English Romantic Literature.
- TANNER, JOHN S.**, *Professor*. PhD, University of California, Berkeley, 1980. Milton; Seventeenth-Century English Literature.
- TANNER, STEPHEN L.**, *Ralph A. Britsch Humanities Professor of English*. PhD, University of Wisconsin, Madison, 1969. American Literature; Literary Criticism.
- TAYLOR, SALLY T.**, *Professor*. PhD, University of Utah, 1975. Technical Writing; Creative Writing.
- THAYER, DOUGLAS H.**, *Professor*. MFA, University of Iowa, 1962. Creative Writing.
- THOMAS, PAUL R.**, *Associate Professor*. DPhil, University of York, England, 1982. Chaucer, Middle English Language and Literature; English Renaissance Literature.
- THURSBY, JACQUELINE**, *Assistant Professor*. PhD, Bowling Green State University, 1994. English Education; Folklore.
- WAHLQUIST, ELIZABETH**, *Associate Professor*. MA, MLitt, Middlebury College, 1962, 1971. Modern American Literature; Adolescent Literature; Robert Frost.
- WALKER, STEVEN C.**, *Professor*. PhD, Harvard University, 1973. Victorian Literature; Bible as Literature.
- YOUNG, BRUCE W.**, *Associate Professor*. PhD, Harvard University, 1983. English Renaissance Literature; Shakespeare.
- ZIMMERMAN, BEVERLY B.**, *Assistant Professor*. PhD, Brigham Young University, 1994. Technical Communication; Computers and Composition.

SCHOOL OF FAMILY LIFE

Director: James M. Harper
Associate Director for Research and Scholarship: Alan J. Hawkins

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 Provo, UT 84602-5525
 (801) 378-9093

Family Sciences and Human Development Graduate Coordinator:
 Craig Hart
 (801) 378-6725

Marriage and Family Therapy Graduate Coordinator: Jeffry H. Larson
 (801) 378-3888
Sociology: (801) 378-6706

THE PROGRAM OF STUDIES

The goal of the School of Family Life is to provide education in prevention and intervention that promotes quality family living across generations. The graduate programs in the school are noted for contributions in theory, philosophy, and practice in home and family life education, optimal human development, and marriage and family therapy.

Faculty research interests focus on intergenerational relationships and programs that strengthen marriages and families.

Five degrees are associated with the School of Family Life: Family Sciences and Human Development—MS; Family Sciences and Human Development—PhD; Marriage and Family Therapy—MS; Marriage and Family Therapy—PhD; Sociology—PhD (Studies of the Family track).

Family Sciences and Human Development—MS, PhD

The graduate program is designed to (1) address the theories, research, and practices that strengthen marriages, (2) enhance the development of children, and (3) unfold the characteristics of quality nurturing relationships across generations. Students are taught to prevent or intervene in challenging family circumstances across the life span and

to understand the factors that contribute to families' temporal well-being.

Typically from six to eight students are admitted each year to the program, with the proportion of MS and PhD degree candidates varying each year. The total number of students in the FSHD programs is usually between twenty-five and thirty.

For a department brochure containing additional information about scholarships, assistantships, ongoing faculty research programs, and research facilities, contact the School of Family Life.

Family Sciences and Human Development—MS

The MS degree in FSHD provides students with a broad-based understanding in family sciences, human development, and resource management. Students construct an individualized program of study that helps them also acquire depth in one or more of these three core areas and/or other areas in the field, such as teaching, family life education, home economics education, and early childhood education. For some the MS is a terminal graduate degree that enhances professional opportunities in educational settings, such as teaching at the college level, in secondary education, or in the Church Educational System, or becoming a university preschool administrator. For other students this degree is a pre-PhD program designed to prepare them for doctoral study.

Admission and Entry.

- Semester of entry and application deadlines: fall, January 10. Students may begin study during spring or summer term.
- Application requirements: (1) at least three letters of recommendation, two of which must be from academic faculty or others qualified to assess academic qualifications; (2) verbal, quantitative, and analytic GRE scores; (3) samples of written work that illustrate the student's ability to reason, analyze, integrate, synthesize, etc.

- Prerequisites: baccalaureate degree, MFHD 300, 310, 460, or equivalent, and 3 hours of introductory statistics.

Requirements for Degree.

- Credit hours: 36.
- Core courses: MFHD 514, 550, 564, 570, 600, MFT 563.
- Program of study: approved by the student's advisory committee. It may include courses that will prepare for certification in early childhood education and/or certification as a family life educator. It also may include in-depth study in areas such as resource management, human development, family processes, home economics, gerontology, or a related field.
- Minor: may be approved by graduate committee, but none required.
- Thesis.
- Examination: defense of thesis and study program.

Family Sciences and Human Development—PhD

The primary focus of doctoral study is to help students become effective educators and scholars. The majority of graduates find professional positions in university departments related to family sciences or child and family studies. Some find positions in community settings, research organizations, or the mass media; and others choose to work for the Church Educational System or in business settings.

The PhD degree in FSHD provides integrated and in-depth learning experiences in family sciences, human development, and resource management. It also offers the opportunity to acquire expertise in a number of different aspects of the field, as well as in several closely related to it, such as sociology and psychology.

Offered on the basis of competence rather than the completion of a specified number of courses, the degree usually requires a minimum 48 hours of course work and 18 dissertation hours. If students have

completed study beyond their master's degree, their transcript is evaluated to determine which courses or other experiences can be applied toward the doctoral program of study.

Admission and Entry.

- Semesters of entry and application deadlines: fall, January 10. Students may begin study during the spring or summer term.
- Application requirements: (A) at least three letters of recommendation, two of which must be from academic faculty or others qualified to assess academic qualifications; (B) verbal, quantitative, and analytic GRE scores; (C) transcripts of previous studies; (D) samples of written work that illustrate the student's ability to reason, analyze, integrate, synthesize, etc.
- Prerequisites: most students complete a master's degree in this or a related field. However, some students may be admitted with a BS or BA degree and complete a master's and then a PhD degree in an integrated program of study. MFHD 514, 550, 564, 570, MFT 563, or their equivalents are prerequisite to doctoral study.

Requirements for Degree.

- Credit hours (66 plus skill): minimum 48 course work hours plus 18 dissertation hours; skill requirement.
- Required courses: MFHD 760; doctoral-level research methods course such as MFHD 601, 602, 604, or MFT 605; MFHD 603 practicums; advanced statistics course.
- Program of study: approved by the student's advisory committee. It may include courses designed to prepare students for certification in early childhood education and/or as a family life educator or for in-depth study in areas such as resource management, human development, family processes, home economics, gerontology, or a related field.
- Minor: recommended but not required. Students without a minor are encouraged to include some

study in other disciplines as part of their program.

- Skill requirement: consult program secretary for guidelines.
- Dissertation: 18 hours minimum.
- Examinations: (A) a comprehensive written examination; (B) oral defense of dissertation.

Marriage and Family Therapy—MS

The marriage and family therapy program offers the master of science degree as a two-year program. The objective of this degree is to train persons who will be outstanding clinicians, prepared to function in a wide variety of marriage and family therapy settings. The curriculum is based on state licensure/certification requirements and is accredited by the Commission on Accreditation of the American Association for Marriage and Family Therapy. The master's degree is the basic educational credential for independent practice in marriage and family therapy.

Admission and Entry.

- Semesters of entry and application deadlines: fall, January 10 (U.S. and international).
- Application requirements: (1) at least three letters of recommendation; (2) GRE general test; and (3) samples of written work.
- Recommended: background in research, e.g., research methodology and statistics (5 hours); behavioral sciences, e.g., personality, child development, abnormal psychology, learning theory (9 hours); social sciences, e.g., family living, social psychology, sociology (6 hours).

Requirements for Degree.

- Credit hours (62): minimum 56 course work hours plus 6 thesis hours (699R).
- Required courses: MFT 555R (6 hours), 563, 645, 649, 650, 651, 652, 653, 654, 655R (10 hours), 656, 699R (6 hours); MFHD 564, 600, 792R (1 hour); Stat 511; electives (3 hours).
- Clinical requirement: 500 hours of direct client experience.
- Thesis.
- Examination: oral defense of thesis.

Marriage and Family Therapy—PhD

The program is accredited by the Commission on Accreditation for Marriage and Family Therapy Education of the American Association for Marriage and Family Therapy and has three interrelated emphases—Clinical Practice, Teaching/Supervision, and Research.

There are two options for the PhD degree in marriage and family therapy. The first, for students who already have a master's degree, should take approximately three years to complete. The second is for the post-baccalaureate student and should take approximately four years to complete. The master's curriculum is followed during the first two years, with the MS degree awarded at the completion of those requirements.

Admission and Entry.

- Semesters of entry and application deadlines: fall, January 10 (U.S. and international).
- Application requirements: (1) at least three letters of recommendation; (2) GRE general test; and (3) samples of written work.
- Recommended:

Post-Master's Degree Option: master's degree from a regionally accredited college or university. (Applicants without a marriage and family therapy master's degree may need to complete prerequisite course work.)

Postbaccalaureate Degree Option: baccalaureate degree from a regionally accredited college or university; background in research, e.g., research methodology and statistics (5 hours); behavioral sciences, e.g., child development, abnormal psychology, learning theory (9 hours); social sciences, e.g., family sciences, psychology, social psychology, sociology (6 hours).

Requirements for Degree.

- Credit hours (80 plus skill beyond baccalaureate; 48 plus skill beyond master's): minimum 62 course work hours beyond the baccalaureate or 30 course work hours beyond the master's, plus 18 dissertation hours (MFT 799R), plus skill hours.

- Required courses: determined in consultation with graduate committee.
- Minor: any minor approved by graduate committee, but none required.
- Skill requirement: consult program.
- Clinical requirement: 500 hours of direct client experience.
- Dissertation.
- Examinations: (A) written and oral comprehensive examinations in clinical practice, teaching/supervision, and research; (B) oral defense of dissertation.

Sociology—PhD (Studies of the Family Track)

See Sociology.

FINANCIAL ASSISTANCE

The programs offer graduate research and teaching assistantships, supplementary awards and scholarships, and internships as aid. Once admitted to the program, the student will receive by mail a program application for financial assistance.

RESOURCES AND OPPORTUNITIES

Certified Family Life Educator Program. Students in the School of Family Life may enhance their graduate programs by taking course work that qualifies them for *provisional status* as a certified family life educator (CFLE). This is a nationally recognized credential given by the National Council on Family Relations for professionals who specialize in teaching and enrichment of marriage and family relationships. The graduate programs in the School of Family Life have been approved by the National Council on Family Relations as offering a quality curriculum that fulfills CFLE requirements. Students who wish to pursue careers in teaching at the college or university level, in providing community marriage and family education programs, or in teaching parent education are encouraged to complete the following CFLE-approved courses as part of their graduate program: MFHD 550, 564, 692R; 540 or 545; 511 or 660; 565; MFT 563, 645; MFHD 561 or MFT 656; MFHD 665 or MFT 656. For additional information see the School of Family Life.

Family Studies Center. An interdisciplinary research institute focusing on studies related to all aspects of the family, the center encourages and supports research on family-related topics ranging from prenatal development to problems of aging. Many of the faculty in the college are actively engaged in such research and receive support from the center. Activities include weekly symposia for sharing and evaluating findings, conferences on special topics, and outreach to bring valuable information on strengthening families to both families and family practitioners.

Comprehensive Clinic. The Comprehensive Clinic at Brigham Young University is a unique interdisciplinary training and research facility housing the finest video and computer facilities available and a staff of skilled technicians and secretaries to support graduate student and faculty research. The clinic currently functions as a training facility for an AAMFT-approved marriage and family therapy PhD and for MS training programs. In addition, the clinic provides the university and the broader geographical community with mental health services involving between 200 and 250 clients each week.

Family, Home, and Social Sciences Computing Center. The center assists faculty and students with social science data processing and other computing needs on main-frame and personal computers. Technical support and consultation services for both statistics and graphics are available to students working on research projects, theses, and dissertations.

Child and Family Laboratories.

These excellent facilities provide a practicum setting in which graduate students develop skills in conducting and interpreting research involving small children.

Women's Research Institute.

Initially established in 1978, the Women's Research Institute became a part of the College of Family, Home, and Social Sciences in September 1983. Since then the institute has awarded fellowships to upper-division and graduate students for conducting research on women and women's issues in amounts up to \$500 annually for selected projects. Faculty grants became available through the institute in 1984.

The college also provides additional research and academic support to family life programs through the Camilla Eyring Kimball Chair of Home and Family Life.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

Marriage and Family Therapy

555R. Beginning Practicum in Marriage and Family Therapy. (2–3)
Prerequisite: MFT 650 and instructor's consent.

Introduction to clinical methods and experience in counseling individuals, premarital and marital dyads, and families. For marriage and family therapy majors only.

563. Theoretical Foundations of Family Systems. (3)

Systems theory and cybernetic approaches to family processes and epistemological issues.

605. Data Analysis Using SPSS Statistical Software. (3)

Use of social science statistical software (SPSS) to analyze marriage and family data.

645. Analysis and Treatment of Human Sexual Development. (3)
Prerequisite: MFT 650.

Knowledge and skill required to analyze and treat questions related to human sexual development.

649. Addictions and Violence in Families. (3)

Assessment and treatment of multiple-problem family systems, emphasizing addictions and abuse.

650. Theoretical Foundations of Marital and Family Therapy. (3)

Epistemological and theoretical issues in marital and family therapy, including normal family processes and personal and intergenerational family issues.

651. Psychopathology and Assessment in Marriage and Family Therapy. (3)

Diagnosing and assessing mental disorders and dysfunctional relationships. Etiology and diagnosis of individual, marital, and family psychopathology.

652. Marital and Individual Psychotherapy. (3)

Assessment, intervention techniques, therapist's role, and principle processes in theories of systemic individual and marital psychotherapy. For marriage and family therapy majors only.

653. Family and Multigenerational Psychotherapy. (3)

Systemic theories and strategies to diagnose and treat specific problems in dysfunctional families. For marriage and family therapy majors only.

654. Issues of Gender and Ethnicity. (3)

Gender, ethnic, and minority issues in family systems, society, and clinical practice as they relate to individual, marital, and family treatment.

655R. Intermediate Practicum in Marriage and Family Therapy. (2–3)
Prerequisite: MFT 555R, 650, or equivalent.

Experience in counseling individuals, premarital and marital dyads, families, groups of dyads, and multiple families. For marriage and family therapy majors only.

656. Ethical, Legal, and Professional Issues for Family Therapists. (3)

For marriage and family therapy majors only.

693R. Independent Readings. (1–3)

695R. Special Topics. (1–3)

Variable topics, including socialization of children, therapeutic intervention with special populations, and marital processes.

699R. Master's Thesis. (6–9)

750R. Supervising Marriage and Family Therapy. (2)

Spring term focuses on theory, research, and practice of supervising marriage and family therapists. Summer term includes supervised experience. For doctoral marriage and family therapy majors only.

751. Advanced Theory in Marriage and Family Therapy. (3)

Advanced family therapy approaches to the diagnosis and treatment of affective, behavioral, and cognitive disorders. For doctoral marriage and family therapy majors only.

753. Advanced Clinical Specialization in Marriage and Family Therapy. (3)

Advanced approaches in treating dysfunctional individual, marital, and family systems. For doctoral marriage and family therapy majors only.

754. Family Therapy for Children and Adolescents. (3)

Family psychotherapy with children and adolescent issues, emphasizing treatment and family interventions. Various theoretical perspectives as well as diagnosis and assessment. For doctoral marriage and family therapy majors only.

755R. Advanced Practicum in Marriage and Family Therapy. (2–3)
Prerequisite: MFT 650, 655R, or equivalent.

For doctoral marriage and family therapy majors only.

770R. Clinical Internship. (1)

Full-time family therapy training and practice at an approved agency.

793R. Research Seminar in Marriage and Family Therapy. (1–3)

Integrating and applying research design and statistics to the study of marital and family therapy. For doctoral majors in marriage and family therapy only.

799R. Doctoral Dissertation. (1–9)

Marriage, Family, and Human Development

501R. Workshop in Marriage, Family, and Human Development. (1–2)

Prerequisite: 8 hours in family sciences or department chair's consent.

Intensive study in applying principles of specified family sciences, subject matter in early childhood education, child development, family relationships, family resource management, or marriage/family therapy.

510. Seminar in Intellectual Development. (3)

Prerequisite: MFHD 514.

Current theories and research on intellectual development.

511. Familial Influences on Social Development. (3)

Prerequisite: MFHD 310 or equivalent.

Current theories and research on social development, peer relations, and behavior. Familial/parenting effects as moderated by beliefs, genetics, gender, social cognitions, culture, child guidance, interventions.

512. Emotional and Moral Development. (3)

Prerequisite: instructor's consent.

Research, theories, and educational implications; preschool through adulthood.

514. Theories of Human Development. (3)

Prerequisite: MFHD 310 or equivalent.

Models and concepts in dominant contemporary developmental theories.

520. Head Teachers Practicum in Preschool. (4)

Prerequisite: MFHD 322, 323, or equivalent.

Head teaching proficiencies: guiding teachers of young children, techniques for involving parents, evaluating student teachers, assessing child performance, reviewing child guidance, and developing curriculum.

522R. Seminar in Early Childhood Education. (2)

Prerequisite: MFHD 322 or equivalent.

Teacher skills: developing, applying, measuring, and evaluating effective techniques. Curriculum: selecting, organizing, and creating curriculum materials for young children.

540. Family Economics. (3)

Economic functioning of household; role of income, employment, and household production as determinants of family living level.

545. Family Financial Resource Management. (3)

Prerequisite: MFHD 304 or equivalent.

Applying theories and principles in managing financial resources to meet needs of individuals and families.

550. (MFHD-Soc) Contemporary Family Theories. (3)

Prerequisite: MFHD 250, Soc 311, or equivalent.

Introduction to basic micro, macro, and processual approaches to study of the family; social and political theory on the family; philosophical issues and assumptions underlying family theory, research, and practice.

551. Fathering: Scholarship and Intervention. (3)

Prerequisite: instructor's consent.

Quality fathering across cultures and in varied family circumstances. Historical changes in fathering; challenges to good fathering; effective interventions with fathers.

561. Seminar in Family Law. (3)

Prerequisite: concurrent registration in MFHD 461.

Intensive investigation of issues and concepts influencing legal aspects of marriage and family life.

564. Human and Family Development Over the Life Cycle. (3)

Interrelationships between individuals and family life cycle development, including modifying family processes and structure over time.

565. Instructional Processes in Marriage, Family, and Human Development. (3)

Methods and curriculum of design, development, implementation, management, and evaluation related to family sciences and home economics curricula.

566R. Preparation for Teaching Practicum. (2)

Prerequisite: instructor's consent.

Developing curriculum in preparation for teaching an undergraduate course in family sciences. Approval of curriculum required before enrolling in MFHD 567R.

567R. Practicum in Family Life Education. (1)

Prerequisite: MFHD 565, 566R, or instructor's consent.

Supervised experience teaching family living courses in a university setting.

570. Paradigms in Family Process and Analysis. (3)

Prerequisite: MFHD 371 or equivalent.

Alternative perspectives on family management, governance, and participation, with emphasis on modernist/management vs. familial orientation affecting leadership, parenting, autonomy and choice, altruism, and individualism.

590R. Readings in Marriage, Family, and Human Development. (1-2)
Prerequisite: MFHD 310 or 460; instructor's consent.

Discussions and reports of current readings.

595R. Special Topics in Marriage, Family, and Human Development. (1-2)

Prerequisite: for family sciences major—MFHD 310 or 460; instructor's consent.

Individual study for qualified students.

600. (MFHD-Soc) Graduate Research Methods. (3)

Prerequisite: MFHD or Soc 300 or equivalent.

Logic and conduct of experimental, quasi-experimental, nonexperimental, survey, and qualitative research.

601. (MFHD-Soc) Seminar in Survey Research. (3)

Prerequisite: Soc 300 or equivalent.

Survey research techniques of the behavioral sciences, emphasizing research and sampling designs.

602. (MFHD-Soc) Experimental Design. (3)

Prerequisite: MFHD-Soc 600, Stat 501 or equivalent, or instructor's consent.

Research methods, logic, writing, and data analysis.

603R. (MFHD-Soc) Research Practicum. (3)

Prerequisite: instructor's consent.

Design, data collection, data analysis, and write-up.

604. (MFHD-Soc) Ethnographic Research Techniques. (3)

Prerequisite: MFDH-Soc 600 or equivalent.

Rationale, methods, and limitations of qualitative research; includes participant observation and hermeneutic skills.

623. History, Theories, and Research in Early Childhood Education. (3)

Prerequisite: instructor's consent.

History, research, philosophies, and models of early childhood education. Current issues and innovations.

660. (MFHD-Soc) Child and Adolescent Socialization. (3)

Child and adolescent development in the context of social interaction, with particular emphasis on the family. Current theory and research evaluated.

662. Human Ecology in Developing Countries. (3)

Interdisciplinary seminar on problems common to families in Third World countries and current approaches to basic needs.

663. (MFDH-Soc 565) The Individual and Family in Later Years. (3)

Developmental aspects of aging, focusing on the biophysical, cognitive, social, affective, and pathological dimensions in people aged fifty and over.

665. Philosophy in Family Life Education. (3)

Prerequisite: MFHD 310, 460, or instructor's consent.

Ethical issues and interpretive frameworks in human science that address quality of life in families.

692R. (MFHD-Soc) Seminar in Family Relationships. (1-3)

Premarital dyad, marital dyad, and issues in family interaction and familial roles.

693R. Independent Readings. (1-3)

695R. Special Topics. (1-3)

Variable topics, including socialization of children, therapeutic intervention with special populations, and marital processes.

699R. Master's Thesis. (6-9)

760. Theory Construction Colloquium. (3)

Prerequisite: MFHD 550, 564, 570, MFT 563; or instructor's consent.

Multiple perspectives on and experience in theory construction and analysis, focusing on familial processes, human development, and resource management.

791R. Seminar in Human Development. (1-2)

Prerequisite: must be a PhD candidate in human development.

792R. (MFHD-Soc) Family Symposium. (0.5)

Presentation and discussion of professional papers about the family.

794R. Special Topics in Child Development. (1-2)

799R. Doctoral Dissertation. (1-9)

FACULTY

BAHR, KATHLEEN S., Associate

Professor. PhD, Michigan State University, 1982. Family Ecology; Family Work.

BEUTLER, IVAN F., Professor. PhD, Purdue University, 1974. Resource Management and Economy.

BURR, WESLEY R., Professor. PhD, University of Minnesota, Minneapolis, 1967. Building, Testing, and Applying Family Sciences Theories.

BUTLER, MARK, Assistant Professor. PhD, Texas Tech University, 1996. Family Therapy.

CLARKE, MARIBETH, Associate Professor. PhD, Utah State University, 1995. Home Economics.

CRANE, D. RUSSELL, Professor. PhD, Brigham Young University, 1979. Marriage and Family Therapy.

DOLLAHITE, DAVID C., Associate Professor. PhD, University of Minnesota, 1988. Fathering.

DRAPER, THOMAS W., Professor. PhD, Emory University, 1976. Early Childhood Education/Human Development.

FEINAUER, LESLIE L., Professor. PhD, Brigham Young University, 1981. Family Violence; Aging Families.

GALBRAITH, RICHARD C., Professor. PhD, Northwestern University, 1975. Human Development; Children's Memory and Intelligence.

GARRISON, CAROLYN, Assistant Professor. PhD, Purdue University, 1978. Household Equipment and Housing.

HARPER, JAMES M., Professor. PhD, University of Minnesota, Minneapolis, 1979. Family Interaction; Sibling Relationships; Aging Couples.

- HART, CRAIG H.**, *Professor*. PhD, Purdue University, 1987. Human Development and Early Childhood Education.
- HAWKINS, ALAN J.**, *Associate Professor*. PhD, Pennsylvania State University, 1990. Fathering; Adult Development; Division of Family Work.
- HOLMAN, THOMAS B.**, *Professor*. PhD, Brigham Young University, 1981. Mate Selection; Qualitative Methodology and Research.
- KLEIN, SHIRLEY R.**, *Associate Professor*. PhD, University of Utah, 1990. Family Life Education; Family Work; Prisons.
- LARSON, JEFFRY H.**, *Professor*. PhD, Texas Tech University, 1980. Marriage and Family Therapy; Family Life Education.
- MCCOY, KELLY**, *Assistant Professor*. PhD, University of Georgia, 1992. Adolescence.
- McKEE, TREVOR R.**, *Associate Professor*. PhD, Brigham Young University, 1973. Language Development; Duolinguual Education; Theories.
- MEAD, D. EUGENE**, *Professor*. EdD, University of Oregon, 1967. Marriage and Family Therapy.
- OLSEN, SUSANNE FROST**, *Assistant Professor*. PhD, University of Georgia, 1992. Parent-Child Relationships Across the Life Course.
- OLSON, TERRANCE D.**, *Professor*. PhD, Florida State University, 1972. Philosophy of Family Science; Family Life Education.
- PODUSKA, BERNARD E.**, *Associate Professor*. PhD, Brigham Young University, 1983. Family Financial Management and Relationships.
- PORTER, CHRIS**, *Assistant Professor*. PhD, Purdue University, 1996. Infancy and Toddlerhood.
- ROBINSON, CLYDE C.**, *Associate Professor*. PhD, University of North Carolina, Greensboro, 1982. Human Development/Early Childhood Education.
- ROWLEY, MAXINE R.**, *Associate Professor*. PhD, Brigham Young University, 1989. Home Economics.

- STAHMANN, ROBERT F.**, *Professor*. PhD, University of Utah, 1967. Premarital, Marital Counseling Education.
- WATSON, WENDY L.**, *Professor*. PhD, University of Calgary, 1984. Family Therapy; Gerontology.

FOOD SCIENCE AND NUTRITION

Chair: Lynn V. Ogden
Graduate Coordinator: Clayton S. Huber

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 Provo, UT 84602
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THE PROGRAM OF STUDIES

The Food Science and Nutrition Department provides course work and research experience in the disciplines of food science and nutritional science. A commitment to excellence is expected and the realization of graduate potential is pursued.

The department's research and instruction make a significant contribution to the balanced development of each student. Students receive excellent academic preparation, with opportunities to develop clear thinking, effective written and oral communication, and intellectual integrity. In this atmosphere they come to understand important concepts in their discipline through both didactic and applied experience.

The graduate programs offered in the Department of Food Science and Nutrition develop students' abilities to use scientific thought processes. Students are encouraged by precept and example to be firmly founded in the discipline and competent to enter the food industry, a health-related industry, or further graduate training.

The Department of Food Science and Nutrition offers two degrees: Food Science—MS and Nutritional Science—MS. The faculty also participate in offering the Molecular Biology—MS and PhD interdepartmental degree with a specialization in the Molecular Biology of Food Science or Molecular Biology of Nutritional Science.

The average number of students in the food science and nutritional science graduate programs is fifteen,

and the usual completion time is two years.

Admission and Entry.

- All graduate programs in food science and nutrition have the same general admission and entry requirements, in addition to those specified with each degree. Semesters of entry and application deadlines: fall, February 1 (U.S. and international); winter, June 30 (U.S. and international).
- Entrance examination: GRE general test. Scores must be submitted with application.

Food Science—MS

The food science master's program prepares students to work at an advanced level in the food industry or to pursue a doctoral degree through in-depth study of the chemistry of food component functionality, the microbiology of product manufacture and preservation, and the physical principals involved in processes. Students become proficient at designing and conducting research and development projects and communicating the results in a manner consistent with the best professionalism in the discipline.

Admission and Entry.

- See preceding general admission and entry requirements.
- Prerequisite: undergraduate major in food science or closely related field.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (FSN 699R).
- Required courses: FSN 652, 654, 656, 691R, Zool 503, Chem 481, Stat 511.
- Minor (optional): selected with approval of faculty advisor.
- Thesis: standard university thesis format or journal publication format.
- Examinations: (A) oral examination on course work; (B) defense of thesis.

Nutritional Science—MS

The MS in nutrition program prepares students for further professional study in medicine or other health sciences; for PhD work in most biological sciences, including nutrition; or to enter government health agencies or food industry work at an advanced level. Graduates will be conversant with the principles of biochemistry and physiology of nutrient functions in humans, with principles of nutrition education, and/or principles of international nutrition, sports nutrition, or nutritional pharmacology. They will be able to use scientific principles and processes to solve current health problems related to nutrient intake in both developed and developing countries.

Admission and Entry.

- See preceding general admission and entry requirements.
- Prerequisite: undergraduate major in nutrition, dietetics, biochemistry, or closely related field.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (FSN 699R).
- Required courses: FSN 531, 532, 631R, 691R; Zool 503 or Soc 600; Stat 511.
- Minor (optional): selected with approval of faculty advisor.
- Thesis: standard university thesis format or journal publication format.
- Examinations: (A) oral examination on course work; (B) defense of thesis.

Molecular Biology Program—MS or PhD

Graduate degrees in molecular biology at Brigham Young University are coordinated by the Molecular Biology Program in the College of Biology and Agriculture. This degree prepares students in the philosophy, procedures, and tools used to perform biological research at the molecular level. Two specializations are available from molecular biology faculty in the Department of Food

Science and Nutrition, the Food Science specialization and the Nutritional Science specialization. Thesis research requires a molecular approach to addressing an important issue in nutritional science or food science. Research projects focus on nutrient control of gene expression, the molecular genetics of obesity or other nutrient-related disease, the molecular basis for nutrient function and dietary requirements, and molecular genetics of dairy starter microorganisms.

Admission and Entry.

Students should apply to the Molecular Biology Program in the college and designate their preferred area of specialization as Food Science or Nutritional Science. See Admission and Entry in the Molecular Biology section of this catalog.

Requirements for Degree.

See Requirements for Degree in the Molecular Biology section of this catalog.

FINANCIAL ASSISTANCE

Limited financial support is available from various sources, including scholarships and research and teaching assistantships. Second-year graduate students have priority on research assistantships. Funds are only occasionally committed to entering graduate students. To apply for teaching and research assistantships or for more detailed information, contact the department.

RESOURCES AND OPPORTUNITIES

Western Center for Dairy Research. Brigham Young University is affiliated with Utah State University and Oregon State University in the Western Center for Dairy Research. As one of six such centers nationwide, it is dedicated to studying cheese and other cultured products.

Dairy Products Laboratory and Pilot Plant. Researchers in the Dairy Products Laboratory conduct research dealing with milk and dairy

products, using full- and pilot-scale equipment.

Sensory Laboratory. The sensory laboratory is a modern taste panel facility used to train students in sensory testing. Panelists register impressions of samples on computerized questionnaires in an isolated booth equipped with aroma and lighting control. Computerized analysis rapidly transforms data into easily interpreted results.

Benson Quality Assurance Lab. The Benson Quality Assurance Laboratory does quality assurance testing for the LDS Church Welfare Services. This research grant provides on-the-job-training, practical experience, and the ability to receive compensation for the time spent in learning.

Dietetic Internship. The ten-month Brigham Young University Dietetic Internship (DI) is currently granted developmental accreditation by the Commission on Accreditation/Approval for Dietetics Education of the American Dietetic Association. Interns meet the competency statements established by the American Dietetic Association for entry-level dietitians. Interns may apply to begin the nutrition MS program when they begin the DI, or complete only the internship.

Faculty and graduate students are currently engaged in a number of significant and interesting research projects, funded both internally and externally. Some of these are: food process development; clinical laboratory methods; effect of nutrient intake on gene expression.

For a more detailed description of the graduate program requirements, send for a copy of the department's graduate student handbook.

COURSE DESCRIPTIONS

501R. (FSN-AgHrt-AnSc) Village Agriculture and Nutrition in Latin America. (1)

Prerequisite: experience in Latin America and/or in issues relative to the seminar.

Problems, successes, failures, and challenges facing those who work in agricultural research, training, and development related to small-scale farmers.

520R. Supervised Practice Experience. (2-4)

Prerequisite: acceptance into dietetic internship.

Supervised practice experience in clinical, management, and community dietetics settings.

531. Advanced Human Nutrition 1. (3)

Prerequisite: FSN 435 or equivalent.

Nutritional status and basis of recommendations for carbohydrates, lipids, protein, and energy.

532. Advanced Human Nutrition 2. (3)

Prerequisite: FSN 435 or equivalent.

Nutritional status and basis of recommendations for vitamins, minerals, and water.

631R. Selected Topics in Food Science and Nutrition. (1-3)

Prerequisite: FSN 531, 532, or instructor's consent.

Subjects that may be offered include:

- Current Controversies
- Diabetes
- Diet and Cancer
- Diet and Cardiovascular Disease
- Eating Disorders
- Food Additives
- Gerontology
- Maternal/Child Nutrition and Health
- Minerals
- Nutrition Education
- Obesity and Weight Control
- Protein
- Sports Nutrition
- Vitamins

637. Advanced Management in Dietetics. (2)

Prerequisite: FSN 374, 375, 445, 458; or equivalents.

Theory and application of management principles in dietetics.

638. Advanced Clinical Nutrition. (2)

Prerequisite: FSN 300, 356, 531, 532.

Theory, techniques, and practices in medical nutrition therapy.

639. Advanced Public Health Nutrition. (3)

Prerequisite: FSN 400, 531, 532.

Program planning, management, and evaluation.

652. Carbohydrates and Their Reactions in Foods. (3)

Prerequisite: FSN 450 or equivalent.

Sugars, higher saccharides, starches, pectins, gums, hemicelluloses, celluloses, and their derivatives and their functions and reactions in foods.

654. Proteins and Their Reactions in Foods. (3)

Prerequisite: FSN 450 or equivalent.

Plant and animal proteins and their functions and changes during food processing; food enzyme properties.

656. Food Lipids and Their Reactions in Foods. (3)

Prerequisite: FSN 450 or equivalent.

Lipids and their reactions in foods with other components of the food system and/or the surrounding environment; lipid-processing techniques.

691R. Graduate Seminar. (1-2)

697R. Research. (1-3)

699R. Master's Thesis. (1-9).

FACULTY

BROWN, LORA BETH, *Associate*

Professor. EdD, Brigham Young University, 1982. Nutrition Education; International Nutrition.

CHRISTENSEN, MERRILL J., *Associate*

Professor. PhD, Massachusetts Institute of Technology, 1982. Selenium Metabolism; Molecular Biology.

FRANZ, KAY B., *Associate Professor*.

PhD, University of California, Berkeley, 1978. Human Nutrition; Mineral Absorption; Metabolism.

HILL, JOHN M., *Professor*. PhD, Rice

University, 1965. Nutritional Biochemistry; International Nutrition.

HUBER, CLAYTON S., *Professor*. PhD,

Purdue University, 1968. Food Chemistry; Food Preservation; Food Processing.

NYLAND, NORA K., *Associate Professor*.

PhD, Kansas State University, 1989. Dietetics; Institutional Management.

ODGEN, LYNN V., *Associate Professor*.

PhD, University of Minnesota, St. Paul, 1973. Food Chemistry; Dairy Products; Food Processing; Sensory Analysis.

PIKE, OSCAR A., *Associate Professor*.

PhD, Purdue University, 1986. Food Chemistry; Lipid Oxidation; Food Processing and Storage.

ROWE, MARK J., *Professor*. PhD,

Brigham Young University, 1972. Molecular Biology; Mitochondrial Genes Affecting Metabolic Rate.

STEELE, FROST M., *Assistant Professor*.

PhD, Purdue University, 1990. Food Microbiology; Molecular Biology.

WOOLLEY, BRUCE H., *Professor*.

PharmD, University of Southern California, 1972. Nutritional Pharmacology.

FRENCH AND ITALIAN

Chair: Cinzia Donatelli Noble

Graduate Coordinator: Jesse D. Hurlbut

Associate Graduate Coordinator: Scott M. Sprenger

4002 JKHB

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THE PROGRAM OF STUDIES

The programs in French are designed to assist students seeking careers in foreign language education, international business or law, or the foreign service. The degree can also serve as a step toward doctoral studies.

One degree is offered through the Department of French and Italian: French Studies—MA. An additional MA in language acquisition (French) is offered as part of the College of Humanities' program in language acquisition.

The average number of students admitted to the programs is from four to five per year. Most students require four semesters to complete the degree.

French Studies—MA

The departmental MA is both versatile and flexible. To complete the degree in one year, students must take four graduate courses in French (two per semester) and four in such approved areas as comparative literature, humanities, linguistics, and Romance philology; the thesis must be written in the spring and summer terms. Alternatively, students may take exclusively French courses (two per semester) over four semesters and then prepare the writing project.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and April 1 (U.S.); winter, June 30 (international) and September 1 (U.S.)
- Application requirements: entrance examination is GRE general test.

- Prerequisite: baccalaureate degree in French or equivalent; advanced French language proficiency based on American Council on Teaching of Foreign Languages (ACTFL) rating.
- Writing sample in French.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Fren 699R).
- Required courses: CmLit 610; minimum 12 credit hours in French; maximum 12 credit hours, including CmLit 610, in related fields such as comparative literature, humanities, linguistics, and Romance philology; 6 hours of Fren 699R (thesis).
- Writing project: thesis.
- Examination: comprehensive oral examination on course work, reading list, and writing project.

Language Acquisition (French)—MA

See program description in Language Acquisition section of this catalog.

FINANCIAL ASSISTANCE

Several graduate teaching fellowships and a few partial-tuition scholarships, based on need, will be available.

RESOURCES AND OPPORTUNITIES

The Department of French and Italian utilizes the **Humanities Research Center** for world-class computer-assisted language instruction and translation. Other resources are:

The Foreign Language Student Residence. Students who desire a more intensive language study experience and practical application of the language under the direction of faculty and native residents may apply to live in the Foreign Language Student Residence. All activities in the individual apartments in the residence are conducted in the foreign language. Graduate

students may participate as students or as senior residents.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

French

670R. Tutorial Internship in French. (3)

Group or individual research in cooperation with graduate faculty member in problems relating to French. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

680R. Special Studies in French. (1-3)

Group or individual study supervised by graduate faculty member in varying topics of specific interest in French.

690R. Seminar in French. (3)

Group or individual study supervised by graduate faculty member in varying topics of specific interest in French.

699R. Master's Thesis. (1-6)

Linguistics

(See Linguistics section of this catalog for courses.)

FACULTY

BUSH, MICHAEL D., *Associate Professor*. PhD, Ohio State University, 1983. Language Acquisition (Computer-Assisted Learning).

COTTLE, MICHAELA V., *Assistant Professor*. PhD, University of North Carolina, Chapel Hill, 1992. French Literature (Twentieth Century, Camus).

CROPPER, CORRY, *Assistant Professor*. PhD, University of Illinois, 1998. Nineteenth Century; French Short Story; Narratology.

HURLBUT, JESSE D., *Assistant Professor*. PhD, Indiana University, 1990. French Literature (Medieval and Renaissance).

LAMBERT, L. GARY, *Professor*. PhD, Rice University, 1969. French Literature (Seventeenth Century, Eighteenth Century, Rousseau, Voltaire).

LE BRAS, YVON, *Assistant Professor*. PhD, Laval University, 1992. French Literature (Seventeenth Century, Francophone).

SOWELL, MADISON U., *Professor*. PhD, Harvard University, 1979. Italian and Comparative Literature (Middle Ages, Renaissance); Descriptive Bibliography.

SPRENGER, SCOTT M., *Assistant Professor*. PhD, Emory University, 1995. French Literature (Nineteenth Century, Twentieth Century, Film).

UNLANDT, NICOLAAS G. W., *Associate Professor*. DLitt, University of Amsterdam, Netherlands, 1992. French Literature (Middle Ages, Old French, Provençal).

GEOGRAPHY

Chair: Richard H Jackson

Graduate Coordinator: J. Matthew Shumway

690 SWKT
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THE PROGRAM OF STUDIES

The master of science in geography is designed to allow students with a major or minor in geography to focus on an area of specialization within the discipline. Geography has been described as the "science of place"—studying human-environment relationships that create the uniqueness of each place.

The department goals focus on providing graduate students experience in research and analysis of the physical and cultural phenomena that shape the world. Seminars and other course work are designed to train graduate students in the geographic research, writing, and presentation skills necessary for employment or further graduate study.

Academically, the department integrates traditional course work with fieldwork and computer analysis of data to train students who can contribute to the solution of the real world issues facing human use of the earth today. The department's computer-based Cartography and Geographic Information Systems Laboratory is one of the premier training centers in GIS in the American west. Combined with the research interests of the department faculty, which are global in their diversity, it provides an unparalleled opportunity for graduate students to experience the excitement of research and creativity.

The average number of students admitted to the program each year is ten; the average duration of the degree program is from one and a half to two years.

One degree is offered through the Department of Geography: Geography—MS.

Geography—MS

This program is designed to provide a general background at the graduate level for either a terminal degree or preparation for more advanced work. Areas of specialization within the degree: Geographic Information Systems, Geography, Planning.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 15 (U.S. and international).
- Application requirements: minimum 3.0 GPA for last 60 semester credits; three academic letters of recommendation; and statement of intent describing field of interest and career goals. Decisions to admit are made by mid-March.
- Entrance examination: GRE general test. Scores must be received by February 15.
- Prerequisite: undergraduate minor in geography or equivalent; strong language background for area studies emphasis; and business mathematics or statistics background for business or industry emphasis.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Geog 699R).
- Required courses: Geog 600, 605, 620, 621, 625.
- No more than 6 hours total from cooperative education (see course descriptions that follow), special problems, or readings courses may be applied toward the degree.
- Minor (optional): supporting courses chosen in consultation with committee.
- Thesis.
- Examination: oral defense of thesis.

FINANCIAL ASSISTANCE

Tuition assistance is awarded by the department on a competitive basis. Graduate students are employed as

research assistants, teaching assistants, and graders.

RESOURCES AND OPPORTUNITIES

Computer Lab. The Geography Department has available for student instruction and use a \$1.3 million computer laboratory that contains state-of-the-art UNIX and Windows NT workstations and software devoted to spatial analysis, statistics, decision making in urban/regional planning, cartography, GIS, photogrammetry, and satellite image processing. The workstations are supplemented by peripherals for scanning, digitizing, and large-format plotting. To assist in field mapping, high-accuracy global positioning system equipment is also provided for student use.

Graduate Student Laboratory. Students will have access to computers and software.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

501R. Topics in Systematic Geography. (1–3)

Detailed investigation of selected geographic topics.

502R. Seminar in Regional Geography. (1–3)

503. Geographic Information Systems. (4)

Prerequisite: graduate standing. For nonmajors who have not taken Geog 211 or 212 or equivalent.

Concepts in the use of geographic information for solving advanced spatial problems. Introduction to use and production of maps and computer-based geographic information systems (GIS) as geographic tools. Hands-on emphasis on research applications in the students' disciplines.

510. Advanced Urban Dynamics and Planning. (3)

Prerequisite: Geog 310, 410, or equivalent.

Advanced study in urban geography and land use planning; emphasizes urban morphology, land use patterns, and spatial analysis; critical evaluation of models and theories.

512. Issues in Computer Cartography. (3)

Prerequisite: Geog 312 or equivalent.

Current techniques for compilation, integration, and display of digital map data.

513. Photogrammetry and Remote Sensing. (3)

Using data obtained from the visible portion (photographs) as well as the broader range (radiometers, radar, microwaves, infrared, remote, etc.) of the electromagnetic spectrum to solve engineering problems. Maps, mapping procedures, and photo and electronic data interpretation.

515. Decision Making in Geographic Information Systems. (3)

Prerequisite: Geog 412 or equivalent. Recommended: CS 103, 130, or 142 or equivalent.

Analysis of geographic information for decision making with emphasis on developing GIS applications using Visual Basic, Avenue, and AML.

517. Analytical Cartography. (3)

Prerequisite: two courses in computer programming, including CS 130 or other introductory course in C or C++; introductory course in trigonometry.

Geocoding, spatial data representation, and map-based transformations.

518R. Applications of GIS and Remote Sensing. (2)

Prerequisite: Geog 212 or equivalent.

Application of GIS and satellite remote sensing methods to practical problems in urban and physical environments.

519. Global Positioning Systems. (2)
Prerequisite: Geog 211 or instructor's consent.

Earth coordinate systems, map projections, and global positioning system methods.

580. Geography of the Developing World. (3)

Analysis and description of the developing world from a spatial perspective; emphasis on environmental challenges to development.

599R. Academic Internship. (1-3)

On-the-job experience. No more than 3 hours in cooperative education may apply toward any one degree.

600. Graduate Colloquium. (3)

Prerequisite: graduate standing.

Nature of geographical investigation and the problems of graduate work.

605. History and Philosophy of Geography. (3)

Analysis of the intellectual history and related paradigms associated with geography as a professional discipline.

612R. Seminar in Cartography and Geographic Information Systems. (3)

Prerequisite: Geog 515.

Integration of remote sensing, geographical information systems, photogrammetry, and fieldwork for solving geographic mapping problems.

620. Seminar in Cultural Geography. (3)

621. Seminar in Physical Geography. (3)

625. Spatial Theory and Analysis. (3)

Examination and spatial application of the mathematical and statistical theories utilized in explaining and predicting geographical phenomena.

690R. Special Topics. (1-4)

699R. Master's Thesis. (1-6)

FACULTY

DAVIS, JAMES A., *Assistant Professor.* PhD, Arizona State University, 1993. Urban Planning; Cultural Geography.

EMMETT, CHAD, *Associate Professor.* PhD, University of Chicago, 1991. Middle East; Political and Cultural Geography.

HARDIN, PERRY J., *Associate Professor.* PhD, University of Utah, 1989. Cartography; Geographic Information Systems; Remote Sensing.

HUDMAN, LLOYD E., *Professor.* PhD, University of Kansas, 1970. Urban Geography; Travel and Tourism.

JACKSON, RICHARD H., *Professor.* PhD, Clark University, 1970. North America; Cultural Geography; Planning.

OTTERSTROM, SAMUEL, *Assistant Professor.* PhD, Louisiana State University, 1997. Planning; Resource Management; Regional.

PLEWE, BRANDON, *Assistant Professor.* PhD, State University of New York, Buffalo, 1997. Geographic Information Systems; Cartography.

SHUMWAY, J. MATTHEW, *Associate Professor.* PhD, Indiana University, 1991. Population; Economic Geography.

GEOLOGY

Chair: Bart J. Kowallis

Graduate Coordinator: Jeffrey D. Keith

S389 ESC

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THE PROGRAM OF STUDIES

Geology is the science that reveals how the earth works. The graduate program in geology at Brigham Young University is designed to prepare scientists to find solutions to many of the environmental and resource problems society faces.

The department offers one degree: Geology—MS. Areas of specialization include: Earth Science Education, Environmental Geology, and Geology.

The expected duration of the MS program is two years for full-time students who enter without deficiencies. The MS degree is designed to give the student a solid foundation in the theoretical and applied aspects of geology and a strong research experience. The thesis component allows each student to develop skills in defining a significant problem, developing a research strategy, acquiring and analyzing data, and technical writing. An MS degree in geology prepares a student for a wide variety of employment opportunities in industry, education, and government, or for advanced study toward a doctoral degree.

The department currently has from approximately twenty to twenty-five graduate students in the MS program.

Geology—MS

Pursuit of the MS degree not only helps prepare students for exciting career opportunities in areas of distinct benefit to mankind, but it also allows them to experience the challenges and rewards of modern scientific research. It is expected that the thesis work will culminate in new

understanding of a problem of scientific significance and that results will be published in a reputable scientific journal.

Areas of specialization: Earth Science Education, Environmental Geology, and Geology.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international); winter, September 15 (U.S. and international).
- Application requirements: minimum required GPA is 3.0 overall and in all physical sciences (mathematics, chemistry, physics), as well as in geology courses.
- Entrance examination: GRE general test. GRE scores must be received in the Geology Department before application for admission will be considered.
- Prerequisite: baccalaureate degree. Arrangements to satisfy undergraduate deficiencies will be made in consultation with graduate coordinator.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Geol 699R); 1 hour of Geol 591R.
- Required courses:
Geology: to be determined in consultation with advisor.
Environmental Geology: Geol 635, 636, 637; 12 hours from Geol 411, 435, 436, 521, 559, 560, 590R (approved by graduate committee), AgHrt 511, ChEn 411, CEEn 545, 550, 555, 641, 654, Hlth 454. Recommended: Stat 501, 502.
Earth Science Education: Geol 502, 697R (approved by graduate committee), ScEd 531; 6–9 hours from Geol 411, 435, 440, 445, 451, 460, 480; 6 hours from IP&T 551, 564, 620, 652, 661, ScEd 601.
 Any additional graduate courses in geology approved by graduate committee may be taken to satisfy remainder of 24 course work hours.
- Publishable thesis.

- Examinations: (A) comprehensive oral examination on course work; (B) final oral defense of thesis.

FINANCIAL ASSISTANCE

New graduate students are eligible for departmental scholarships, tuition waivers, and teaching or research assistantships on a competitive basis.

Most regular degree-seeking students receive *some form* of financial aid. However, none may expect financial assistance from the department for more than four semesters.

Graduate students are also encouraged to seek additional support from industries and agencies outside the Department of Geology. **Note:** Such requests must be submitted to the department chair, who will forward them with a supporting letter.

RESOURCES AND OPPORTUNITIES

The Department of Geology has recently moved into the newly remodeled Eyring Science Center in 1998. Extensive renovation includes the construction of state-of-the-art classrooms with multimedia capabilities, new office space for faculty and graduate assistants, and modern laboratories. The new facilities house extensive instrumentation, computer facilities, and mineral, rock, and fossil collections.

The location of the university campus on the Wasatch Front near the juncture of the Rocky Mountains, the Colorado Plateau, and the Great Basin provides an incomparable natural laboratory for geology studies. The Department of Geology utilizes this natural setting, and the many geologic problems that remain in it to be studied, as one of our main assets.

The department is well equipped for graduate research in geology. A partial list of research equipment available includes: an X-ray fluorescence spectrometer, atomic absorption spectrophotometers, a gradient elu-

tion ion chromatograph, an automated single-crystal X-ray diffractometer, powder X-ray diffractometers, a visible/UV spectrophotometer, a cathodoluminescence microscope, a fluid inclusion heating and freezing stage, a core plug porosimeter/permeameter, Worden gravimeters, proton precession magnetometers, a ground-penetrating radar system, a twenty-four-channel seismic system, variable offset electrical resistivity equipment, and a Mössbauer spectrometer. Additional research facilities include:

The Earth Science Museum. This developing museum with affiliated laboratories houses major fossil groups, including one of the best dinosaur collections in the country. It also offers significant, and in some cases unique, assemblages of rocks, minerals, and maps, providing many research opportunities for faculty and students.

Fission Track Dating Laboratory. This laboratory provides student and faculty researchers with the geochronological potential to solve problems in stratigraphy and structural geology, to determine rates of uplift and subsequently to aid in thermal modeling, and to provide support for numerous other faculty and student research projects where dating of events is necessary.

Hydrogeochemistry Laboratory. The hydrogeochemistry lab supports research programs in hydrology, environmental geology, economic geology, and petrology. In addition, the lab is used in teaching modern analytical techniques in upper-division undergraduate and graduate courses. Groundwater composition, migration, and pollution have been major emphases of research.

Faculty research interests currently include: studies of regional Cenozoic magmatism and tectonism in the Great Basin; composition of thermal waters; Cenozoic mammals in Mexico; Jurassic dinosaurs; Jurassic and Cretaceous bentonites; location and distribution of underground hazardous waste using geophysical

methods; crystallography and crystal chemistry of silicate minerals; investigations of shallow subsurface geology using gravity, seismic, electrical, and magnetic methods; origins of copper and molybdenum deposits; tungsten skarns; characterization of petroleum reservoir quality and trapping potential; Devonian ammonoids; and Carboniferous-Permian conodont biostratigraphy in the U.S. and Russia.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

510. Conducted Field Trips. (1)

Prerequisite: any college-level geology course and instructor's consent.

Geology field trips.

511. Advanced Structural Geology. (3)

Prerequisite: Geol 311, 410.

In-depth discussions of a variety of topics in structural geology, emphasizing current literature and problems.

521. Borehole Geophysics and Geology. (3)

Prerequisite: Phscs 121, 122, Geol 351, 370.

Applied well log analysis, including conventional and new techniques. Subsurface geology and lithology determined from many logs. Determining porosity, permeability, fluid saturation with hydrology, and hydrocarbon applications.

525. Petroleum Geology and Basin Analysis. (4)

Prerequisite: Geol 370.

Origin, migration, and entrapment of liquid and gaseous hydrocarbons. Tectonic basin development, including extensional, compressional, flexural, and strike-slip processes. Processes of basin-fill and thermal histories.

545. Isotope Geochemistry. (3)

Prerequisite: Geol 352.

Use of stable and radioactive isotope systematics in geochronology and investigation of origins of rocks and waters.

551. Advanced Mineralogy. (3)

Prerequisite: Geol 351, Phscs 121, 122, 221.

Crystallography, structure, and crystal chemistry of major silicate mineral groups.

556. Applied Geomathematics. (3)

Prerequisite: Math 112, 113, Phscs 121, 122, 221.

Applications of algebra, geometry, trigonometry, calculus, matrices, computers, and statistics to the analysis and interpretation of geoscience data.

559. Applied Geophysics 1. (3)

Prerequisite: Geol 311, Phscs 121, 122, 221.

Principles, tools, and methods in gravity, magnetic, and electromagnetic exploration; acquisition, processing, and interpretation of gravity and magnetic data. Field trips.

560. Applied Geophysics 2. (3)

Prerequisite: Geol 311, 559, Phscs 121, 122, 221.

Principles, tools, and methods used in seismic geophysics, with exploration, engineering, environmental, and hydrological applications; acquisition, processing, and interpretation of seismic data. Field trips.

565R. Special Topics in Geology. (2-4)

Prerequisite: instructor's consent.

The following topics may be offered on demand: Geology for Teachers, X-Ray Crystallography, Instrumental Methods, Ore Deposits.

574. Advanced Stratigraphy. (3)

Prerequisite: Geol 370 or equivalent. Recommended: Geol 480 or equivalent.

Study of the stratigraphic record through modern methods of correlating stratal packages, emphasizing concepts of chronostratigraphy, biostratigraphy, lithostratigraphy, and absolute dating. Extended field trip required.

580. Principles of Paleontology. (3)

Prerequisite: Geol 480.

Modern approaches to fossil study applied to areas of evolution, paleoecology, and biostratigraphy.

586. Vertebrate Paleontology. (4)

Prerequisite: instructor's consent.

History of vertebrate fossils. Field trips required. Credit applies in either zoology or geology. Laboratory studies.

590R. Short Courses. (1-3)

Short graduate-level courses offered on a random basis.

591R. Seminar. (0.5)

Seminars on various geologic topics by guest speakers. Total of 1 credit hour required.

599R. Academic Internship. (1-9)

635. Advanced Hydrogeology. (3)

Prerequisite: Geol 435; Math 321 or concurrent registration.

Equations governing fluid flow through saturated porous media under various geologic conditions; applying hydraulic characteristics to analysis of well and aquifer conditions.

636. Hydrogeochemistry. (3)

Prerequisite: Geol 435 or instructor's consent; Chem 105, 106, 107, or 111, 112.

Nature and origin of solutes and isotopes in groundwater systems. Applying geochemistry to evaluation of groundwater recharge conditions and flow patterns.

637. Groundwater Modeling. (3)

Prerequisite: Geol 435 or instructor's consent; Chem 105, 106, 107, or 111, 112.

Computer modeling and groundwater systems.

655. Igneous Petrology. (3)

Prerequisite: Geol 552.

Origin and crystallization behavior of magmas, emphasizing crystal-liquid relations in simple experimental systems.

671. Sedimentary Petrology—Carbonate Rocks. (3)

Prerequisite: Geol 370.

Characteristics and significance of limestones and dolomites.

672. Sedimentary Petrology—Clastic Rocks. (3)

Prerequisite: Geol 370.

Characteristics of conglomerates, sandstones, and shales. Provenance studies of various terrains by thin section analysis. Extended field trip - required.

695R. Research. (1-4)

696R. Readings and Conferences in Geology. (1-4)

697R. Directed Field Studies. (1-6)

699R. Master's Thesis. (6-9)

FACULTY

BAER, JAMES L., *Professor. PhD,* Brigham Young University, 1968. Geologic Engineering.

BENSON, ALVIN K., *Professor. PhD,* Brigham Young University, 1972. Geophysics; Environmental Geophysics.

CHRISTIANSEN, ERIC H., *Professor. PhD,* Arizona State University, 1981. Petrology; Geochemistry.

GRIFFEN, DANA THOMAS, *Professor. PhD,* Virginia Polytechnic Institute, 1975. Mineralogy; Crystallography.

HARRIS, RON, *Associate Professor. PhD,* University of London, England, 1989. Structure; Tectonics; Disaster Mitigation.

KEITH, JEFFREY D., *Professor. PhD,* University of Wisconsin, 1982. Economic Geology; Geochemistry; Environmental Geology.

KOWALLIS, BART J., *Professor. PhD,* University of Wisconsin, Madison, 1981. Structural Geology; Geochronology.

MABEY, MATTHEW A., *Assistant Professor. PhD,* Brigham Young University, 1992. Seismicity; Geophysics.

MAYO, ALAN L., *Professor. PhD,* University of Idaho, 1981. Hydrogeology; Environmental Geology.

MILLER, WADE E., *Professor. PhD,* University of California, Berkeley, 1968. Vertebrate Paleontology.

MORRIS, THOMAS H., *Associate Professor. PhD,* University of Wisconsin, Madison, 1986. Sedimentology; Stratigraphy.

NELSON, STEPHEN T., *Assistant Professor. PhD,* University of California, Los Angeles, 1991. Isotope Geochemistry; Environmental Geology.

RITTER, SCOTT M., *Professor. PhD,* University of Wisconsin, Madison, 1986. Invertebrate Paleontology; Carbonate Petrology.

GERMANIC AND SLAVIC LANGUAGES

Chair: Gary L. Browning
Graduate Coordinator, German Literature: Thomas Plummer

4094 JKHB
Provo, UT 84602-6115
(801) 378-4923

THE PROGRAM OF STUDIES

One degree is offered through the Department of Germanic and Slavic Languages: German Literature—MA. An additional MA in language acquisition (German, Russian, or Scandinavian) is offered as part of the collegewide program in language acquisition (see Language Acquisition section of this catalog).

From four to six students are admitted to the literature program each year. Most students complete the degree within two years.

German Literature—MA

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and April 1 (U.S.); winter, June 30 (international) and September 1 (U.S.).
- Application requirements: entrance examination is GRE general test.
- Prerequisite: baccalaureate degree in German or in a related field such as English, comparative literature, humanities, etc. Minor deficiencies in German linguistics, culture, or other areas may be made up by enrolling in appropriate undergraduate courses. German language proficiency in all four skills at the advanced level as defined by the American Council on Teaching of Foreign Languages (ACTFL)—equivalent to the Interagency Language Roundtable (ILR) level 2.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Germ 699R).

- Required courses: 3 hours from CmLit 620R, 630R, 640R, 650R, 660R (should be a German-related topic; see graduate advisor before registering); 21 hours of German graduate courses; 6 hours of Germ 699R (thesis).
- A reading knowledge of a second foreign language (fourth semester or equivalent).
- Examination: oral examination on reading list (see graduate advisor), course work, and thesis.

FINANCIAL ASSISTANCE

Partial tuition assistance is available. Most MA students also work as paid teaching assistants.

RESOURCES AND OPPORTUNITIES

The Department of Germanic and Slavic Languages has access to the **Humanities Research Center** for computer-assisted language instruction and translation. Other resources are:

The Foreign Language Student Residence. Students who desire a more intensive language experience and practical application of the language under the direction of faculty and native residents may apply to live in the Foreign Language Student Residence. All activities are conducted in the foreign language. Housing is available for men and women in German, French, Spanish, Italian, Portuguese, Russian, Japanese, Chinese, Arabic, and Korean languages. Graduate students may participate as students or as senior residents.

The Summer Language Institute. During the summer term the College of Humanities offers a program that allows a student total immersion in a foreign language while receiving course credit. Housing is provided for participants where the language can be applied on a practical level. Employment is available for graduate students.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

German

615. Applied German Linguistics. (3) On dem.

Prerequisite: Germ 450, 460, or equivalent.

Applying linguistics to the problems of teaching German grammar.

640R. German Literary Periods and Movements. (3)

In-depth study of a period or movement such as medieval, Renaissance, baroque, or eighteenth-century Germany; Romanticism; realism; fin-de-siècle Vienna; naturalism; 1890–1945; 1945–present.

641R. Studies in German Literary Genres. (3)

In-depth study of a genre such as drama, novel, novella, lyric, film.

642R. Major German Authors. (3)

In-depth study of one author such as Lessing, Goethe, B. V. Arnim, Kleist, Storm, Rilke, Brecht, Mann, Kafka, or Bachmann.

643R. Studies in Literary Theory. (3)

In-depth study of primary texts by contemporary literary theorists. May include topics such as the Frankfurt School, feminist criticism, reader response, or poststructuralism.

670R. Tutorial Internship in German. (1–3)

Individual research in cooperation with graduate faculty members in problems relating to German. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisors.

680R. Special Studies in German. (1–3)

Individual study supervised by graduate faculty members in varying topics of specific interest in German.

690R. Seminar in German. (3)

Group studies supervised by graduate faculty members in varying topics of specific interest in German.

699R. Master's Thesis. (1–6)

Linguistics

(See Linguistics section of this catalog for courses.)

Russian

670R. Tutorial Internship in Russian. (1–3)

Individual research in cooperation with graduate faculty members in problems relating to Russian. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisors.

680R. Special Studies in Russian. (1–3)

Individual study supervised by graduate faculty members in varying topics of specific interest in Russian.

690R. Seminar in Russian. (1–3)

Group studies supervised by graduate faculty members in varying topics of specific interest in Russian.

699R. Master's Thesis. (1–6)

Scandinavian

529. Old Norse. (3)

Recommended: knowledge of a modern Scandinavian language.

Returned missionaries from Iceland or those with equivalent experience should enroll in Inclnd 429. Grammar and exercises. Readings in Old Norse literature.

590R. Directed Readings in Scandinavian. (1–3)

Prerequisite: written plan of study approved by both the instructor and program coordinator.

Directed individual study.

670R. Tutorial Internship in Scandinavian. (1–3)

Individual research in cooperation with graduate faculty members in problems relating to Scandinavian. Tutorial work in writing research papers. Topics vary according to interests and expertise of faculty supervisor.

690R. Seminar in Scandinavian. (1-3)

Group studies supervised by graduate faculty members in varying topics of specific interest in Scandinavian.

699R. Master's Thesis. (1-6)

FACULTY

ABBOTT, SCOTT, *Associate Professor*. PhD, Princeton University, 1979. German Literature (Eighteenth, Nineteenth, Twentieth Centuries); Literary Theory.

BAKER, JOSEPH O., *Associate Professor*. PhD, Tulane University, 1968. German Literature (Kleist, Realism).

BREWER, CINDY P., *Assistant Professor*. PhD, University of Utah, 1998. German Literature (Eighteenth- and Nineteenth-Century Prose, Literature by Women).

BROWNING, GARY L., *Professor*. PhD, Harvard University, 1974. Russian Literature (Nineteenth- and Twentieth-Century Writers).

HART, DAVID KAY, *Professor*. PhD, University of Washington, 1979. Russian Language (Phonology, Morphology, Syntax).

JARVIS, DONALD K., *Professor*. PhD, Ohio State University, 1970. Russian Language (Pedagogy, Testing).

JONES, RANDALL L., *Professor*. PhD, Princeton University, 1970. German Language (Technology and Second-Language Acquisition); Pedagogy; German Corpus Linguistics.

KEELE, ALAN F., *Professor*. PhD, Princeton University, 1971. German Literature (Earlier Twentieth Century, 1945-Present, Rilke, Grass).

KELLING, HANS-WILHELM, *Professor*. PhD, Stanford University, 1967. German Literature (*Goethezeit*); Cultural History.

LUND, RANDALL J., *Assistant Professor*. PhD, University of Minnesota, 1986. Foreign Language Methodology; Teacher Education.

LYON, JAMES K., *Professor*. PhD, Harvard University, 1963. German Literature (Holocaust, Brecht, Celan).

NEMIROVSKAYA, JULIA, *Assistant Professor*. PhD, Moscow State University, 1991. Russian Literature (Poetry, Contemporary Literature).

PLUMMER, THOMAS G., *Professor*. PhD, Harvard University, 1972. German Literature (Weimar Period, Berlin, Modernism; German Film).

ROGERS, THOMAS F., *Professor*. PhD, Georgetown University, 1968. Russian Literature (Twentieth-Century Drama); Film.

SOLOVYOVA, RAISA, *Assistant Professor*. PhD, Novosibirsk State University, Russia, 1982. Russian Literature (Nineteenth and Twentieth Century).

STOTT, MICHELLE, *Associate Professor*. PhD, University of Utah, 1987. German Literature (Lessing, Eighteenth and Nineteenth Centuries, Women's Studies).

HEALTH SCIENCES

Chair: Gordon B. Lindsay
Graduate Coordinator: Brent Q. Hafen

229-A RB
Provo, UT 84602-2115
(801) 378-2348

THE PROGRAM OF STUDIES

The Department of Health Sciences is committed to the proposition that quality of life can be maintained or improved through understanding and applying disease/disability prevention and health enhancement principles. Such principles are relevant to the physical, emotional, social, intellectual, and spiritual well-being of individuals and groups in vocational, community, and family settings. The departmental mission is to prepare professionals to function in and for these settings as health education and health promotion specialists.

The purpose of the graduate program is to prepare individuals to be leaders and administrators in health education and health promotion programs in a variety of settings.

One degree is offered through the Department of Health Sciences: Health Sciences—MS.

The department usually admits ten students to its MS program in the fall semester of each academic year. The average length of time required to complete the degree is from one to two years, depending on course load and previous academic training or professional activity.

Health Sciences—MS

The department offers a master of science degree with an emphasis in Community Health. The master's degree in community health is frequently the entry-level requirement for community health professional positions.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination: GRE general test.
- GPA: minimum 3.0 for last 60 hours of undergraduate work.
- Prerequisite: baccalaureate degree with a major or minor in community health, health education, health promotion, biological sciences, nursing, physical education, therapeutic recreation, or other allied fields. Applicants will be required to satisfy any deficiencies. Courses taken in doing so will not count toward the required hours for the degree.

Requirements for Degree.

- Credit hours (36): minimum 30 hours of course work plus 6 hours of thesis.
- Required core courses: Stat 552; Hlth 650, 651, 652 or 455, 672, 678, 692, 694.
- Required courses in emphases are determined by student's graduate committee based on prior education, experience, and present professional interests.
- Thesis: Hlth 692 and Stat 552 should be taken first semester or as early as possible in preparation for thesis.
- Examinations: oral defense of thesis.

FINANCIAL ASSISTANCE

Graduate teaching assistant positions are available for qualified students. Applications are available for research assistants and tuition scholarships.

RESOURCES AND OPPORTUNITIES

The Department of Health Sciences is housed in the Richards Building. Its in-house research facility is the **Human Performance Research Center**. The center supports applied and basic research programs of faculty and graduate students on such topics as nutrition and exercise, drugs and exercise, exercise and

cardiovascular disease, exercise and weight control, and other contemporary issues in exercise science. In addition to serving graduate students and faculty in the college, the center works closely with departments in other colleges on campus—notably in the fields of physiology, nutrition, endocrinology, and biochemistry—to broaden the scope of research projects and encourage collaborative efforts.

Another resource is the **Learning Resource Center**, which offers eighteen individual study areas and significant PC capabilities, audio and video equipment, and line access to library files and catalogue.

Internships with attendant project opportunities provide a varied resource for individuals and cooperative investigations. Additional assistance in research planning and statistical analysis is available through other support programs existing on campus.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

599R. Academic Internship. (Arr.) Prerequisite: completion of a major in health sciences or graduate student status in health sciences.

On-the-job experience.

603R. Health Problems Workshop. (1–7)

Current problems in school and community health.

610. Nonviolent Crisis Intervention. (2)

Training program with related research literature developed by the National Crisis Prevention Institute focusing on management of disruptive, assaultive, or out-of-control behavior.

620. Health Policy and Health Care Reform. (2)

Alternative health-care delivery systems in the U.S.; combining health education with appropriate health-promotion policies.

640. Grant Writing. (2)

For students who are seeking philanthropic, federal, and other sources of funding.

650. Review and Processing of Health Information. (3)

Source evaluation and content review of contemporary research in health sciences.

651. Community Organization for Health. (2)

Theory and practices in community organization for health. Evaluating group work methods and leadership theories. Field observations required.

652. Health Education Program Planning. (2)

Principles of health education program design, administration, marketing, and evaluation.

661. Curriculum Development and Instructional Design. (2)

Design and evaluation of health education curricula.

665. Behavioral Health. (2)

Analysis of current research and theory concerning health behaviors and psychological factors in the cause, prevention, development, and treatment of physical and behavioral illness and disorders.

666. Health and Aging Process. (2)

Advanced theories of the normal and pathological aging process, including health promotion and extension of life.

671. Graduate Practicum. (1)

Role and functions of the college health teacher. Supervised experience in teaching and research.

672. Community Health Methods. (2)

Analysis and application of theories, models, and principles related to health education methods. Emphasizes community mobilization, policy development, and health communication.

678. Statistical Methods in Epidemiology. (3)

Prerequisite: HLth 478 or equivalent.

Statistical techniques for analyzing data from epidemiology, environmental health, biomedical, and other public health-related research, including linear and logistic regression and life tables.

692. Research Methods in Health Sciences. (3)

Designing, analyzing, and writing research, focusing on methodological skills.

694. Graduate Seminar in Health Sciences. (2)

696R. Independent Studies. (1-3)

698R. Master's Project. (1-6)

699R. Master's Thesis. (1-9)

FACULTY

BARNES, MICHAEL D., *Associate Professor*. PhD, Southern Illinois University, 1993. Community Health.

HAFEN, BRENT Q., *Professor*. PhD, Southern Illinois University, 1969. Behavioral Health; Research.

HEINER, STEVEN W., *Professor*. EdD, University of Utah, 1969. Gerontology; Social Hygiene.

HURLEY, D. RICHARD, *Associate Professor*. PhD, Southern Illinois University, 1971. Statistics; Substance Abuse.

KARREN, KEITH J., *Professor*. PhD, Oregon State University, 1975. Behavioral Health.

LINDSAY, GORDON B., *Associate Professor*. PhD, Ohio State University, 1984. Community Health; Health Promotion.

NEIGER, BRAD L., *Associate Professor*. PhD, University of Utah, 1991. Community Health.

ROLLINS, L. MCKAY, *Professor*. PhD, University of Utah, 1971. International Health; Administration; Health Education.

SALAZAR, RICHARD D., *Assistant Professor*. PhD, Southern Illinois University, 1972. Research Methods; Statistics.

THYGERSON, ALTON L., *Professor*. EdD, Brigham Young University, 1969. Injury Prevention; Emergency Care.

HISTORY

Chair: Kendall Brown

Graduate Coordinator: Thomas G. Alexander

410 KMB

Provo, UT 84602-4446

(801) 378-2944

THE PROGRAM OF STUDIES

The History Department has a small but high-quality graduate program. It aims to strengthen the credentials of those teaching history and to produce professional historians.

The strengths of the program are U.S. (especially western American) and European history. This reflects the research interests of departmental faculty and the holdings of the university's Harold B. Lee Library.

Two degrees are offered through the History Department: History—MA and History—PhD.

The department admits twelve students to the graduate programs each year. The average length of the MA program is two years; the average length of the PhD program is five years.

History—MA

The MA degree is offered for those students who desire to do further historical study and research beyond the bachelor's degree. The advantages of this degree include: opportunities in public history, access to careers in business, greater promotional and employment opportunities for secondary teachers, qualification for teaching positions in many junior colleges, and useful preparation for doctoral work in history, law, government, international affairs, and other relevant fields.

Areas of emphasis within the MA: American History or European History.

Students desiring a master's degree in Latin American, Asian, or Middle Eastern history should apply to the relevant program in the David M.

Kennedy Center for International Studies.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: submit at least three letters of recommendation from persons familiar with applicant's academic qualifications, preferably professors, and a sample of applicant's work. Send directly to the department a research paper such as a senior seminar paper. Students whose native language is not English must pass the TOEFL examination at the 85th percentile or higher (a score of 580). Minimum required GPA is 3.2 for last 60 hours. Consult the History Department for further details before applying for admission.
- Entrance examination: GRE general test.
- Prerequisite: undergraduate degree in history or equivalent.

Requirements for Degree.

- Course requirements:
American History Emphasis (30 hours): minimum 24 course work hours including Hist 587, 690R; two courses selected from Hist 561, 562, 563; plus 6 thesis hours (699R).
European History Emphasis (30 hours): minimum 24 course work hours including Hist 587, 690R; two or more courses selected from Hist 661, 662, 663; plus 6 thesis hours (699R).
- Minor: optional as approved by graduate committee.
- Thesis.
- Examination: oral defense of thesis.

History—PhD

Note: The department is not admitting PhD students for the 1999–2000 academic year.

The PhD is designed to train students to be effective teachers, productive scholars, and useful professionals in the field of history. Professional opportunities for the doctoral graduate include: careers in

university, college, junior college, and high school teaching; library and archival work; the Church Educational System; government research agencies; and professional writing.

Areas of emphasis within the PhD: American History or European History. Fields of concentration in American History are Western America, History of Religion in America, and American Social History.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: send at least three letters of recommendation from persons familiar with applicant's academic qualifications, preferably professors, and a copy of applicant's master's thesis directly to the department. Students whose native language is not English are required to pass the TOEFL examination at the 85th percentile or higher (a score of 580). The minimum required GPA is 3.4 for last 60 hours. Consult the History Department for further details before applying for admission.
- Entrance examination: GRE general test.
- Prerequisite: master's degree in history or equivalent.

Requirements for Degree.

- Credit hours (54 beyond baccalaureate): minimum 36 course work hours beyond the baccalaureate plus 18 dissertation hours (Hist 799R).
- Course requirements: first year in residence—see current class schedule; consult with advisor.
- Core courses for European history emphasis: Hist 661, 662, 663.
- Core courses for American history emphasis: Hist 561, 562, 563 (other courses to be determined by graduate committee).
- Progress review: after 18 hours of course work, there will be an oral progress review in which the student's graduate committee will determine whether the student has

proved competent to remain in the program. Students should finish all course work and tool requirements and pass the written comprehensive examinations within three years after beginning the program.

- Skill requirement: consult department.
- Dissertation prospectus: presented upon successful completion of the oral comprehensive examination.
- Dissertation.
- Examinations: (A) comprehensive written examination in a general field (major area), a field of emphasis within that general field, and a secondary field in history; also a minor field outside history, chosen in consultation with the committee chair; (B) oral comprehensive examination, given after student successfully passes the written comprehensive examination.
- Oral defense of dissertation.

FINANCIAL ASSISTANCE

A small tuition grant can be provided to graduate students in the History Department. In addition, a teaching assistantship of 10 to 15 hours may be available to qualified graduate students.

RESOURCES AND OPPORTUNITIES

Center for Studies of the Family.

This interdisciplinary research center focusing on studies related to all aspects of the family encourages and supports research on family-related topics ranging from prenatal development to problems of aging.

Women's Research Institute.

Initially established in 1978, the Women's Research Institute became a part of the College of Family, Home, and Social Sciences in September 1983. Since then the institute has awarded research fellowships to upper-division and graduate students for conducting research on women and women's issues in amounts up to \$500 annually for selected projects. Faculty grants

became available through the institute in 1984.

Joseph Fielding Smith Institute for Church History. The institute's purpose is to study the Latter-day Saint past. Its personnel are historians whose primary work is writing and publishing for professional and general Church audiences. The institute also seeks to facilitate the research of other Church history scholars by providing limited support for research and publication.

Museum of Peoples and Cultures. This museum offers unique research opportunities for students and faculty, several of whom have research offices in the museum. Located south and west of campus in Allen Hall, the museum holds a number of important archaeological and ethnographic collections that have not been systematically analyzed and reported. These collections, which represent Utah Valley, the American Southwest, and Mesoamerica, as well as other parts of the world, provide material for thesis topics, professional publications, and academic credit.

Charles Redd Center for Western Studies. Established in 1972 under an endowment from Charles Redd, a prominent Utah stockman and philanthropist, the center is charged with promoting the study of all aspects of the American West. The center publishes a monograph series, assists faculty and student research through grants and fellowships, and sponsors lectureships each year.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500R. Special Studies in History. (1-3)

Directed by visiting or resident faculty. Check with department secretary for current topics and instructor.

561. Sources and Problems in Early America. (3)

Through the seventeenth and eighteenth centuries. Required of American and European history graduate students.

562. Sources and Problems in Nineteenth-Century America. (3)

Through the nineteenth century. Required of American and European history graduate students.

563. Sources and Problems in Twentieth-Century America. (3)

Through the twentieth century. Required of American and European history graduate students.

564. Sources and Problems in Western U.S. History. (3)

Lecture, discussion, readings, and student writing on historians' sources and points of view regarding the American West.

565. Sources and Problems in Latter-day Saint History. (3)

Lecture, discussion, readings, and student writing on historians' sources and points of view regarding Latter-day Saint history.

566. Sources and Problems in Utah History. (3)

Lecture, discussion, readings, and student writing on historians' sources and points of view regarding Utah history.

587. Philosophies of History. (3)

Fundamental problems and types of historical analysis and interpretation, philosophies of history, and work of outstanding historians.

590R. Special Topics. (3)

Western American, religious, family, Asian, Latin American, and Near Eastern history.

598R. Special Readings in History. (1-2)

661. Sources and Problems in Medieval, Renaissance, and Reformation History. (3)

Selected topics in medieval, Renaissance, and Reformation history.

662. Sources and Problems in Early Modern Europe, 1550-1789. (3)

Selected topics in early modern Europe, 1550-1789. Part of the core curriculum for graduate students.

663. Sources and Problems in Modern Europe, 1789-Present. (3)

Selected topics in nineteenth- and twentieth-century Europe, 1789-present.

690R. Graduate Seminar in History. (1-3)

695R. Coordinated Research. (3)

Student research directed by faculty member on topic of mutual interest. Prior approval of instructor required. Research assistants must do additional work for credit.

696R. Practicum in Public History and Family History. (1-5)

College credit for work in local archives, museums, and related areas. See department chair for openings available and to determine hours of credit.

698R. Master's Project. (1-6)

699R. Master's Thesis. (1-9)

798R. Special Readings in History. (1-2)

799R. Doctoral Dissertation. (1-18)

FACULTY

ALEXANDER, THOMAS G., *Professor.*

PhD, University of California, Berkeley, 1965. Western American; Environmental; Latter-day Saint History, Utah History.

BOHAC, RODNEY D., *Associate*

Professor. PhD, University of Illinois, 1982. Russia; Rural Europe.

BRITSCH, R. LANIER, *Professor.* PhD, Claremont Graduate School, 1967. Asian Religions; Missiology.

BROWN, KENDALL W., *Professor.* PhD, Duke University, 1979. Latin America; Colonial Economic; Spain.

BUTLER, LEE A., *Assistant Professor.*

PhD, Princeton, 1990. Early-Modern and Modern Japan; Asia.

CANNON, BRIAN Q., *Associate Professor*. PhD, University of Wisconsin, 1992. American Rural History.

DAYNES, JOHN G., *Assistant Professor*. PhD, University of Delaware, 1996. American Intellectual.

DOXEY, GARY B., *Assistant Professor*. PhD, Cambridge University, 1992. Medieval Mediterranean.

DURSTELER, ERIC R., *Assistant Professor*. PhD, Brown University, 1999. Late Medieval Italy; Mediterranean.

FOX, FRANK W., *Professor*. PhD, Stanford University, 1973. Modern U.S.; U.S. Cultural History.

GARCIA, IGNACIO, *Associate Professor*. PhD, University of Arizona, 1995. American, Mexican-American History.

GOWANS, FREDERICK R., *Professor*. PhD, Brigham Young University, 1972. Western America; American Indian; Fur Trade.

GRANDSTAFF, MARK, *Assistant Professor*. PhD, University of Wisconsin, Madison, 1992. American Military; Diplomatic.

GREEN, ARNOLD H., *Professor*. PhD, University of California, Los Angeles, 1973. Modern Near East.

HAMBLIN, WILLIAM, *Associate Professor*. PhD, University of Michigan, 1985. Middle East.

HARLINE, CRAIG H., *Professor*. PhD, Rutgers University, 1986. Early Modern Europe.

HOLMES, BLAIR R., *Associate Professor*. PhD, University of Colorado, 1972. European Family; Social History.

MADSEN, CAROL CORNWALL, *Professor*. PhD, University of Utah, 1985. Women's History; American History.

MILLER, SHAWN W., *Assistant Professor*. PhD, Columbia University, 1997. Latin America, Colonial Brazil.

MONTGOMERY, DAVID C., *Professor*. PhD, Indiana University, Bloomington, 1971. Central Asia; Middle East; Central Asian and Middle Eastern Languages.

MURDOCK, MICHAEL G., *Assistant Professor*. PhD, University of Michigan, 1998. Modern Asia; China; Nationalism.

PIXTON, PAUL B., *Professor*. PhD, University of Iowa, 1972. Medieval Europe.

PRATT, DAVID H., *Professor*. PhD, University of Nebraska, Lincoln, 1975. British Family; Modern English.

PULSIPHER, JENNY HALE, *Assistant Professor*. PhD, Brandeis University, 1999. U.S. Colonial; Women's; Native American.

RICHARDS, MARY STOVALL, *Associate Professor*. PhD, University of Chicago, 1983. Family; Nineteenth-Century America—South; Twentieth-Century Southern Novelists.

RUGH, SUSAN SESSIONS, *Assistant Professor*. PhD, University of Chicago, 1993. Nineteenth-Century U.S.

THORP, MALCOLM R., *Professor*. PhD, University of Wisconsin, Madison, 1972. Early Modern; Modern Britain.

TOBLER, DOUGLAS F., *Professor*. PhD, University of Kansas, 1967. Modern Germany; European Intellectual History.

WALKER, RONALD W., *Professor*. PhD, University of Utah, 1977. American Religious History; Utah History.

WESTOVER, V. ROBERT, *Assistant Professor*. PhD, Arizona State University, 1979. Family; American Indian.

WRIGHT, DAVID C., *Assistant Professor*. PhD, Princeton University, 1993. China; Asia.

YORK, NEIL L., *Professor*. PhD, University of California, Santa Barbara, 1978. Colonial History; Technology; American Revolution.

HUMANITIES, CLASSICS, AND COMPARATIVE LITERATURE

Chair: George S. Tate
Graduate Coordinator, Comparative Literature: V. Stanley Benfell
Graduate Coordinator, Humanities: Joseph D. Parry

3010 JKHB
 Provo, UT 84602-6120
 (801) 378-4448

THE PROGRAM OF STUDIES

Widely used in the Renaissance, the term *humanities* (*humanitas* or *studia humanitatis*) refers to the study of human intellectual and artistic creativity. Humanities is both a general academic category (inclusive of literature, history, philosophy, and the history and criticism of art and music) and a discipline in its own right with a methodology for the critical study of intellectual history and aesthetics. The interdisciplinary humanistic fields that the department comprises—humanities, classics, and comparative literature—offer students unusual latitude in developing rich graduate programs, disciplined by insistence on substantial foreign language skills, competence in critical theory and practice, and the development of scholarly abilities.

Three degrees are offered through the Department of Humanities, Classics, and Comparative Literature: Comparative Literature—MA; Humanities—MA; and Comparative Literature—PhD (minor).

Comparative literature and humanities each admit from five to six students per year. The MA programs are designed as two-year programs, and most full-time students are able to complete the MA within two years, usually defending the thesis during spring or summer term of the second year.

Classics. The classics graduate program has been temporarily furloughed. Until further notice, no students will be accepted into the program and no 500- or 600-level courses will be offered. It is possible, however, for students in humanities or comparative literature to do work in classics and the classical tradition as part of their graduate programs. Classics faculty occasionally serve on graduate committees in humanities or comparative literature; two have joint appointment in comparative literature.

Comparative Literature—MA

Comparative literature is the study of literature in its totality. Graduate students in this field combine the synthesizing and analytical skills of various humanistic disciplines with high-level foreign language achievement in order to study literary text closely. Accordingly, program courses expand knowledge of the discipline and provide intense opportunities to develop wide-ranging research writing abilities.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 28 (international) and May 15 (U.S.); winter, June 30 (international) and September 15 (U.S.); spring, October 31 (international) and February 15 (U.S.); summer, December 31 (international) and March 15 (U.S.).
- Entrance examination: GRE general test.
- Prerequisite: baccalaureate degree in literature; and thorough reading knowledge (300 level) of two of the three languages required for degree.

Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours (CmLit 699R).
- Required courses: CmLit 610; 12 hours from 620R, 630R, 640R, 650R, 660R, or 690R; and 699R.
- Electives: 12 hours of literature.
- Language requirement: thorough reading knowledge (300 level) of three languages, one of which

must be German or French, and one of which may be English for students who choose to emphasize British, American, or other anglophone literature.

- Thesis.
- Examination: final oral examination and defense of thesis.

Comparative Literature—PhD (Minor)

The PhD minor in comparative literature is designed to enrich the programs of doctoral students in other historical, theoretical, or humanistic disciplines by providing a framework for the formal consideration of interrelationships between literary study and other areas of knowledge.

Requirements for Degree.

- Credit hours: minimum 12 course work hours.
- Thorough knowledge of three literary traditions, one of which must be French or German, in two periods each.
- All readings done in original language.
- Examinations: written and oral examinations on areas of concentration. Students may be asked to demonstrate their facility with the languages relevant to their program during either or both of the examinations.

Humanities—MA

This degree provides training in humanities scholarship with a focus on interdisciplinary studies. Each aspect of the program has been designed to assist the graduate student in strengthening the skills required of scholars and teachers working in the field. Program courses concentrate on expanding knowledge of the field and of modes of interpretations. Courses also provide the student with opportunities to develop and expand research and writing skills in the humanities.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1.
- Entrance examination: GRE general test.

- Prerequisite: baccalaureate degree in humanities. Applicants with degrees in art history, history, literature, music, or philosophy may also be admitted but may be required to make up deficiencies in preparation through additional interdisciplinary course work. Also, completion of an upper-division literature course in a foreign language is required.

Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours (Hum 699R).
- Required courses: Hum 610, 615; two sections of 620R in different periods; two courses from 625R, 660R, 690R; 699R.
- Electives: 12 hours in literature, art history, musicology, history, film, philosophy, or humanities (up to 6 hours may be in upper-division undergraduate classes).
- Emphasis: A 9-hour emphasis (no additional hours beyond required and elective courses listed above) in a particular period or geographical area, radiating from one of the required sections of 620R or from 625R; at least one course in the emphasis must be from electives offered in approved courses outside the department.
- Thesis (in the emphasis area).
- Examination: final oral examination that focuses on areas of concentration but also requires some general knowledge; thesis defense.

FINANCIAL ASSISTANCE

Aid is available in the form of full or partial tuition grants, teaching assistantships, internships, and (for advanced students) some student instructorships. Upon admission to the respective programs, candidates will be considered for all of these possibilities based upon merit and availability of department resources. Financial aid is limited to two years.

RESOURCES AND OPPORTUNITIES

The Department of Humanities, Classics, and Comparative Literature

utilizes the Humanities Research Center and the Reading-Writing Center for the College of Humanities:

The **Humanities Research Center** provides an array of technological tools, resources, and expertise to foster quality research and scholarship in the College of Humanities. The center is especially active in the production of teaching and research materials. In addition to computer and audio equipment, the center has a variety of video capabilities and in the past few years has become a world leader in computer-assisted language instruction and translation. The department also owns CD ROM databases for classical Greek and Latin texts, the *Thesaurus Linguae Graecae* and *Thesaurus Linguae Latinae*, as well as the complete works of many modern authors.

Faculty from the department currently serve as officers in the Classical Association of the Midwest and South (CAMWS), the International Comparative Literature Association (ICLA), the National Association of Humanities Educators (NAHE), the American Conference on Romanticism, and the Society for the Advancement of Scandinavian Study (SASS). In addition, the journals *Scandinavian Studies* and *Prisms: Essays in Romanticism*, as well as the *ICLA Bulletin*, are edited by department faculty members, assisted by graduate students from the department.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletins on humanities or comparative literature.

COURSE DESCRIPTIONS

Comparative Literature

595R. Directed Readings. (1-3)

Prerequisite: graduate coordinator's consent.

610. Methods of Study in Comparative Literature. (3)

Introduction to critical study of literature: critical methods and bibliography; linguistic foundations of literature; textual scholarship; literary history, transmission, theory, and criticism; genre theory; literature and other disciplines.

620R. Studies in Periods and Movements. (3)

Prerequisite: CmLit 610 or concurrent registration.

Various literary periods, movements, etc., and problems of periodization. Topics vary.

630R. Studies in Literary Genres. (3)

Prerequisite: CmLit 610 or concurrent registration.

Various genres (e.g., novel, epic, tragedy, lyric) and problems of genre. Topics vary.

640R. Studies in Themes and Types. (3)

Prerequisite: CmLit 610 or concurrent registration.

Major literary themes (e.g., Faust, Don Juan, Ulysses, Arthur), types, motifs, and problems of literary typology. Topics vary.

650R. Studies in Literary Relations. (3)

Prerequisite: CmLit 610 or concurrent registration.

Interrelations of national literatures and figures and of literature with other areas of knowledge (art, history, law, psychology, music, etc.). Topics vary.

660R. Studies in Literary Theory. (3)

Prerequisite: CmLit 610 or concurrent registration.

Critical theories of literature and literary analysis. Topics vary.

670R. Tutorial Internship. (3)

Prerequisite: graduate coordinator's consent.

Individual research in cooperation with graduate faculty member, generally on problems relating to a specific national literature.

690R. Seminar in Comparative Literature. (3)

Prerequisite: CmLit 610.

Problems in comparative literature. Course content varies from semester to semester.

699R. Master's Thesis. (1-9)

Prerequisite: graduate coordinator's consent.

Humanities

595R. Directed Readings. (1-3)

Prerequisite: graduate coordinator's consent.

610. Research Methods in Humanities. (2)

Prerequisite: instructor's consent.

Use of the library and secondary sources.

615. Writing the Thesis Prospectus. (1)

Prerequisite: Hum 610.

Design and development of MA thesis prospectus.

620R. Studies in Periods and Movements. (3)

Interdisciplinary study of literature, philosophy, and the arts of a particular period or movement in cultural history. Problems of periodization. Topics vary.

625R. Area Studies in the Humanities. (3)

Interdisciplinary study of literature, philosophy, and the arts of a particular geographical area. Topics include American, Latin American, and Asian humanities. Topics vary.

630R. Genres and Forms in the Humanities. (3)

Interdisciplinary study of genres and forms. Topics include epic, tragedy, narrative, historiography, film, relationship of text and music. Topics vary.

640R. Themes in the Humanities. (3)

Interdisciplinary study of themes. Topics include Eden, Arthur, Don Juan, Faust, Don Quixote, Ulysses, Troy. Topics vary.

660R. Critical Theory and Methodology. (3)

Theoretical and practical criticism; problems in critical theory. Topics include aesthetics, interrelations of the arts, cultural theory, aspects of contemporary theory, and models of cultural history.

690R. Seminar in the Humanities. (3)

Interdisciplinary study of problems and major figures in the humanities. Topics vary.

699R. Master's Thesis. (1-9)

Prerequisite: graduate coordinator's consent.

FACULTY

BASSETT, ARTHUR R., *Professor.* PhD, Syracuse University, 1975. Humanities: American Humanities; Victorian Art and Culture.

BENFELL, V. STANLEY, *Assistant Professor.* PhD, New York University, 1994. Comparative Literature: Medieval and Renaissance Literature (Italian, French, and English).

BRITSCH, TODD A., *Professor.* PhD, Florida State University, 1966. Humanities: Art and Society; Interrelations of Arts; Eighteenth Century.

BUTLER, TERRELL M., *Associate Professor.* PhD, Cornell University, 1979. Humanities and Comparative Literature: Seventeenth-Century France and England; Greek Literature; Rhetorical Criticism.

CALL, MICHAEL J., *Associate Professor.* PhD, Stanford University, 1982. Humanities: Eighteenth- and Nineteenth-Century French Literature and Arts; Romanticism.

CHRISTENSON, ALLEN J., *Assistant Professor.* PhD, University of Texas, Austin, 1998. Humanities: American (Colonial and Federalist), Native American, and Mesoamerican (especially Precolumbian) Culture.

DEBLOOIS, Nanci, *Assistant Professor.* PhD, University of Iowa, 1994. Classics: Greek and Latin Poetry.

DUCKWITZ, NORBERT H. O., *Assistant Professor.* PhD, University of Colorado, 1987. Classics: Latin Poetry; Greek and Roman Mythology.

GARDNER, JANE K., *Assistant Professor.* PhD, Florida State University, 1998. Humanities: Eighteenth- and Early Nineteenth-Century Culture; Classical Tradition; Women's Studies; the Novel.

GREEN, JON D., *Associate Professor.* PhD, Syracuse University, 1972. Humanities: Interrelations of the Arts; Modernism; Multimedia.

HALL, JOHN F., *Professor.* PhD, University of Pennsylvania, 1984. Classics: Roman History, Religion, and Law; Latin Literature.

HANDLEY, GEORGE B., *Assistant Professor.* PhD, University of California, Berkeley, 1995. Humanities: Nineteenth- and Twentieth-Century American, Caribbean, and Latin American Culture; Ethnic Arts; Cultural Theory

HUNTSMAN, ERIC D., *Assistant Professor.* PhD, University of Pennsylvania, 1997. Classics: Greek and Roman History; Greek and Latin Literature; Women in Antiquity.

LOUNSBURY, RICHARD C., *Professor.* PhD, University of Texas, Austin, 1979. Classics and Comparative Literature: Early Imperial Literature; Rhetoric; Classical Tradition.

MACFARLANE, ROGER T., *Associate Professor.* PhD, University of Michigan, 1991. Classics: Republican and Augustan Latin Literature.

MARSHALL, DONALD R., *Professor.* PhD, University of Connecticut, 1971. Humanities: Film as Art; American Humanities.

PARRY, JOSEPH D., *Assistant Professor.* PhD, University of Utah, 1995. Humanities: Middle Ages and Renaissance.

PEER, LARRY H., *Professor.* PhD, University of Maryland, College Park, 1969. Comparative Literature: Romanticism; Theory.

PHILLIPS, MICHAEL D., *Assistant Professor.* PhD, University of Chicago, 1998. Humanities: Cultural History; Latin America; Cultural Theory; Popular Culture.

SHUMWAY, LARRY V., *Associate Professor.* PhD, University of Washington, 1974. Humanities: Music; Asian Humanities; Ethnomusicology.

SONDRUP, STEVEN P., *Professor.* PhD, Harvard University, 1974. Comparative Literature: Nineteenth- and Twentieth-Century Literature.

TATE, GEORGE S., *Professor.* PhD, Cornell University, 1974. Humanities and Comparative Literature: Medieval Studies (Scandinavian, German, English; Twelfth-Century Renaissance).

INSTRUCTIONAL PSYCHOLOGY AND TECHNOLOGY

Chair: Paul F. Merrill

201 MCKB
Provo, UT 84602-5089
(801) 378-7072

THE PROGRAM OF STUDIES

Instructional psychology and technology is a branch of educational study concerned with the ideas, principles, and theories related to the improvement of instruction. Students of instructional psychology and technology seek to identify and implement improvements in instruction while endeavoring to understand the principles that govern these improvements. These solutions are implemented in educational settings in public schools and universities, business, industry, the government, the military, the community, and the church. The instructional psychology and technology program at Brigham Young University teaches students the knowledge, methods, and technologies necessary for disciplined research into instructional issues.

The objective of the Department of Instructional Psychology and Technology is to enhance learning by improving instruction and teaching. In partnership with others, the department will (1) search for knowledge that improves instruction, (2) apply knowledge and technology to solve instructional problems, and (3) empower students with knowledge and skills in instructional development, research, evaluation, and measurement.

Students in each degree program are required to take basic courses in the following areas of disciplined inquiry in instruction: design and development, research, measurement, and evaluation. They are also required to acquire collateral tools from other disciplines such as statis-

tics, computer science, human resource management, and communications. Specialized courses are offered to deepen the candidate's knowledge and theoretical sophistication. Professional skills are developed through extensive project and internship experiences offered in the schools, church, home, and community.

The Department of Instructional Psychology and Technology offers two degrees: Instructional Psychology and Technology—MS and Instructional Psychology and Technology—PhD.

Approximately thirty students are enrolled in the MS program and fifty students in the PhD programs. Full-time students should be able to complete an MS degree within approximately two years; full-time PhD students with an MS in instructional psychology and technology should be able to complete the PhD within three years.

Master's and doctoral students in other departments wishing to take a minor in instructional psychology and technology should counsel with the instructional psychology and technology faculty member appointed to their graduate committee in selecting the appropriate courses (9 hours of course work required for a master's minor, 12 hours for a doctoral minor).

Instructional Psychology and Technology—MS

The MS program is designed for students who desire to emphasize instructional design and production or multimedia in instruction. However, students may also emphasize research and evaluation. Considerable flexibility is built into the program to allow students to tailor their program in accordance to their background and professional goals.

Admission and Entry.

Fall semester and summer term entry only.

- Semesters of entry and application deadlines: fall, summer, February 1.

- Application requirements: letter of intent and three letters of recommendation.
- Entrance examination: GRE general test. When taking GRE, use institutional number R 4019. Application will not be considered without GRE scores.
- Prerequisite: (3 hours) EdLF 517 or Engl 316.

Requirements for Degree.

- Credit hours (minimum 35): 29 course work hours plus 6 thesis hours (IP&T 699R) or 6 project hours (698R).
- Required courses (14 hours): IP&T 515R (Microcomputers in Schools), 564, 652, 662 or 672, Stat 510.
- Emphasis: 12 hours to be determined in consultation with graduate committee.
- Internship: 3 hours (IP&T 680R).
- Thesis, 6 hours (IP&T 699R); or project, 6 hours (IP&T 698R).
- Examinations: oral defense of thesis or project.

Instructional Psychology and Technology—PhD

Designed to allow students to tailor their program in accordance to their background and professional goals, the PhD program includes specializations in instructional design and production, research and evaluation, and second-language acquisition.

Admission and Entry.

Fall semester and summer term entry only.

- Semesters of entry and application deadlines: fall, summer, February 1.
- Application requirements: letter of intent and three letters of recommendation.
- Entrance examination: GRE general test. When taking GRE use institutional number R 4019. Application will not be considered without GRE scores.
- Prerequisite: (3 hours) EdLF 517 or Engl 316 or Ling 230 or 330.
- Foreign language and skill requirement: there are two options for completing this requirement depending on area of specialization: (A) instructional design and production and research and

evaluation specializations (equivalent of at least 18 hours in statistics and computer science); or (B) second-language acquisition specialization (equivalent of at least 14 hours of statistics and computer science and at least intermediate proficiency in a second foreign language, demonstrated by test or by course work completed through the 202 level). This means that students must have two languages in addition to English to complete this specialization.

Requirements for Degree.

- Credit hours (minimum 73): 55 course work hours plus 18 dissertation hours (IP&T 799R).
- Required courses (16 hours): IP&T 620 or Psych 560; IP&T 564, 652, 661, and 672 or Psych 500R or Ling 600.
- Specialization: 18 hours as determined in consultation with graduate committee.
- Internship: 15 hours (IP&T 680R).
- Two projects: 6 hours.
- Residence: at least two consecutive 6-hour semesters on the BYU Provo campus.
- Examinations: (A) comprehensive written examination; (B) oral defense of dissertation.
- Time limit: all requirements for the doctorate must be completed within an eight-year period.

FINANCIAL ASSISTANCE

Financial assistance is available mainly in the form of paid internships through the Instructional Psychology and Technology Department, other departments within the university, and various agencies external to the university. Limited funds are available for partial tuition scholarships for students with emergency financial needs. Other financial aid is available through the university.

RESOURCES AND OPPORTUNITIES

Instructional psychology and technology utilizes the David O. McKay Education Building for the majority

of its classrooms and resource centers.

The college and department provide extensive microcomputer and multimedia facilities for student use. Macintosh, MS-DOS, and Windows computers are available in various computer laboratories. Most of these computers are connected to the university broad-band network, which provides convenient access to a large number of computer-based software tools, such as SPSS and SAS statistical analysis programs, the university library card catalog, the ERIC index, and the Internet.

The McKay Building's Learning Resource Center provides materials such as educational tests, curriculum guides, media kits, and audiovisual supplies.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

515R. Microcomputers in Schools. (1-3)

Applying computer technology in the public schools; evaluating educational software programs; using computer tools; computer programming in LogoWriter.

551. Introduction to Quantitative Reasoning. (3)

Introduction to statistical reasoning and methodology. Meaning and use of quantitative methods in answering substantive questions of educational research and practice. Using computer software packages.

560. Microcomputer Materials Production. (3)

Prerequisite: IP&T 286 or 515R (Microcomputers in Schools); CS 103 or equivalent.

Designing, programming, and debugging educational applications of microcomputers using a high-level computer language.

564. Instructional Design. (3)

Identifying instructional problems; specifying objectives, instructional strategies, and media; analyzing learning outcomes; developing instructional materials and assessment instruments; validating instructional systems.

620. Principles of Learning. (3)

Improving classroom learning through understanding underlying psychological principles and theories.

651. Quantitative Reasoning. (3)

Prerequisite: IP&T 551 or equivalent.

Use of analysis of variance and multiple regression/correlation in analyzing and interpreting results of educational research and evaluation.

652. Assessing Learning Outcomes. (4)

Prerequisite: Stat 510 or equivalent.

Selecting and constructing instruments and procedures for assessing affective, behavioral, and cognitive outcomes of education.

653. Measurement Theory. (3)

Prerequisite: Stat 510 or equivalent.

Classical and modern models for measuring human attributes. Issues related to reliability, validity, item selection, scoring, standard setting, and test equating. Use of item response theory and generalizability theory.

654. Computers in Educational Measurement. (2-4)

Prerequisite: IP&T 652 or instructor's consent.

Types of computerized measurement and assessment methods and item forms, as well as their development, delivery, and statistical theory.

655. Instructional Print Design and Production. (2)

Prerequisite: IP&T 564.

Applying instructional and visual design principles to produce instructional print materials, using computer-based tools.

657R. Measurement Project. (1-3)
Prerequisite: IP&T 652, Stat 510; or equivalents.

Designing, conducting, and reporting a comprehensive measurement project.

660. Authoring of Interactive Video. (3)

Prerequisite: IP&T 560, 564.

Designing, developing, producing, and authoring intelligent, interactive video courseware. Budgets, project steps, equipment systems, and authoring.

661. Evaluation in Education. (3)

Nature, purposes, and functions of educational evaluation in making judgments about teachers, instructional materials, academic programs, curricula, and school systems.

662. Evaluation of Instructional Products. (2)

Prerequisite: Stat 510 or equivalent.

Formative and summative evaluation of replicable instructions/products and procedures.

663. Evaluation of Educational Programs and Curricula. (3)

Prerequisite: IP&T 661 or instructor's consent.

Problems in designing, conducting, and reporting the results of program and curriculum evaluations.

664. Advanced Instructional Design. (3)

Prerequisite: IP&T 564.

Advanced laboratory in instructional system design, production, formative evaluation, packaging, and implementation. Systematic critical analysis of all phases of development.

665. Instructional Visual/Video Production. (4)

Recommended: IP&T 515R or equivalent.

Designing, producing, and integrating audio, visual, and video instructional materials. Applying digital and other technologies in audio recording and mixing, and photographic and video production.

667R. Evaluation Project. (1-3)

Prerequisite: IP&T 661.

Designing, conducting, and reporting a comprehensive project in evaluation.

672. Empirical Inquiry in Education. (3)

Prerequisite: Stat 510 or equivalent.

Introduction to empirical research in education. Emphasizes designing, conducting, analyzing, reporting, and evaluating.

673. Research Synthesis and Conceptualization. (3)

Prerequisite: IP&T 672.

Survey of major research problems, questions, and theories that have been investigated in instructional science. Preparing critical, integrative synthesis of completed research; conceptualizing problems for further inquiry. Research prospectus required.

674R. Inquiry Methods. (1-3)

Prerequisite: IP&T 672 or instructor's consent.

Specific inquiry strategies for researching practical educational problems. Strategy studied varies from section to section.

- Naturalistic Inquiry in Education
- Quasi-Experimental Studies
- Cost-Benefit Analysis in Education
- Meta-Analysis
- Theory Building and Modeling in Education

677R. Research Project. (1-3)

Prerequisite: IP&T 672.

Designing, conducting, and reporting a comprehensive project in research.

680R. Internship. (1-6)

Prerequisite: departmental consent.

682. Project and Instructional Resource Management. (3)

Managing research, development, and evaluation projects in public schools and higher education. Planning, budgeting, supervising, managing personnel, and scheduling.

687R. Development Project. (1-3)

Prerequisite: IP&T 564.

Designing, conducting, and reporting a comprehensive project in development.

690R. Seminar. (1-3)

Check current class schedule for seminar topics.

692R. Advanced Topics. (1-3)

693R. Directed Individual Study. (1-3)

Prerequisite: instructor's consent.

698R. Master's Project. (1-6)

699R. Master's Thesis. (1-6)

760R. Advanced Computer-Based Instruction. (3)

Prerequisite: IP&T 560.

Current issues, research, and applications of computer technology in education. Advanced programming.

790R. Advanced Seminar. (1-3)

Check current class schedule for seminar topics.

799R. Doctoral Dissertation. (1-9)

Prerequisite: completion of skill and project requirements.

Formal report and defense of a substantive research topic designed to make an original contribution to knowledge in the field.

FACULTY

BUNDERSON, C. VICTOR, Professor.

PhD, Princeton University, 1965.

Computers in Measurement and Instruction.

GREEN, EDWARD E., Professor. EdD,

Indiana University, Bloomington, 1972. Instructional Design.

HARRISON, GRANT V., Professor. EdD,

University of California, Los Angeles, 1969. Product Research.

INOUE, DILLON K., Associate

Professor. PhD, Stanford University, 1978. Productivity in Learning.

MERRILL, PAUL F., Professor. PhD,

University of Texas, Austin, 1970. Second Language Acquisition; Computer Applications to Education.

- NELSON, LAURIE M., *Assistant Professor*. PhD, Indiana University, 1998. Instructional Theory; Systemic Change in Education.
- OSGUTHORPE, RUSSELL T., *Professor*. PhD, Brigham Young University, 1975. Research with Disabled Students.
- SUDWEEKS, RICHARD R., *Associate Professor*. PhD, University of Illinois, 1978. Educational Measurement and Evaluation.
- VAN MONDFRANS, ADRIAN P., *Professor*. PhD, University of Wisconsin, Madison, 1967. Evaluation Theory and Practice.
- WILLIAMS, DAVID D., *Associate Professor*. PhD, University of Colorado, 1981. Naturalistic Evaluation; Research.

INTERNATIONAL AND AREA STUDIES

Associate Director for Graduate Studies: Phillip J. Bryson
Graduate Subfield Coordinators:
American Studies: Gregory Clark
Asian Studies: Dana S. Bourgerie
International Development Studies Joint MA/MOB Program:
 Warner P. Woodworth
International Relations: Phillip J. Bryson
Ancient Near Eastern Studies:
 Victor L. Ludlow
International Business Joint MBA/MA Program: Stanley E. Fawcett

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 (801) 378-2526
 Fax: (801) 378-8748
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THE PROGRAM OF STUDIES

David M. Kennedy Center for International Studies

The David M. Kennedy Center offers a multidisciplinary master of arts degree in international and area studies. This one-year degree includes the subfields of American Studies, Asian Studies, International Relations, and Ancient Near Eastern Studies. Two joint degree programs also exist: the International Development—MA/MOB and the International Business—MA/MBA (subfields of International Relations or Asian Studies).

Course work is tailored to suit the student's individual interests and career direction. Each subfield is organized differently, but most have a flexible curriculum, with a core of required classes. Please contact the coordinator for curriculum or other information pertaining to any subfield.

The program is extremely competitive, and enrollment is limited. The predoctoral MA program is to be completed in one calendar year of

full-time study. The joint programs are of approximately two and a half years' duration.

DIRECTION OF THE GRADUATE PROGRAM IN INTERNATIONAL AND AREA STUDIES

The MA in international and area studies is a strong preparation for doctoral study. It is not considered an ideal terminal degree, although it may serve to add an international dimension to a professional graduate degree. Placement in academic or international careers is highly competitive and often requires practical job skills or advanced academic training in addition to the master of arts degree. Academic and career objectives should be carefully weighed to determine whether this program will enhance career opportunities.

Before applying, interested persons may make an appointment with the director of graduate studies to evaluate the usefulness of an international and area studies graduate degree for their career goals. Request general application information from the graduate secretary at the David M. Kennedy Center, 237 HRCB, Provo, UT 84602-4538, telephone (801) 378-3378.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S and international). Admission is handled through the BYU Office of Graduate Studies. Application forms can be requested from Graduate Admissions, B-356 ASB, Provo, UT 84602-1341. Applicants should complete all parts of the application form required by the university, with appropriate fees and transcripts, and indicate the department as International and Area Studies, code 570168. The chosen subfield of emphasis should be entered on the application form where a major is requested.
- Application requirements: minimum GPA is 3.2. Joint degree program applicants (working with the

Organizational Leadership and Strategy Department or the MBA program) must also be accepted by the Marriott School. Submit a statement of intent indicating past international experience, career goals, professional skills, and how the degree will serve your career goals. Indicate research interests. Also submit three letters of recommendation from persons who can comment on your academic ability, motivation, and interpersonal skills. Check with subfield coordinator for subfield prerequisites.

- Entrance examination: GRE general test. An official copy of the test scores must be submitted to Graduate Admissions, and scores should be indicated on part D of the application form. Concurrent MBA applicants may submit GMAT. For international applicants the TOEFL is required, in addition to one of the preceding tests; minimum score of 600.
- Prerequisite: baccalaureate degree; undergraduate background in a relevant field, or satisfied deficiency; competency in a foreign language approved by committee chair: 16 undergraduate credit hours, including a third-year conversation course, or other evidence of conversational fluency (foreign language not required for American Studies emphasis).

Requirements for Degree.

- Credit hours (32): thesis program (8 required, 18 electives, 6 thesis); for joint programs, contact subfield coordinator.
- Required course work: IAS 501R (fall and winter), IAS 600 (fall), subfield core readings seminar, selected methodology course (fall or winter), IAS 699R (6 thesis hours, spring or summer). The subfield core readings seminar, the selected methodology course, and all electives are to be determined in consultation with the subfield coordinator or the thesis advisor. There may be additional required courses for a particular subfield. Please contact subfield coordinator.
- Thesis.

- Examination: oral examination on course work along with oral defense of thesis.

FINANCIAL ASSISTANCE

The financial aid application deadline is February 1. The following financial aid is available: supplementary awards, which pay full or partial tuition for qualified students, awarded on the basis of academic standing; assistantships, paid positions requiring from five to ten hours of work per week; and research grant monies, awarded on the basis of proposal merit and topic.

COURSE DESCRIPTIONS

501R. Graduate Colloquium. (1)

Methodologies and reading. Preparation of thesis prospectus and presentation. Required of all international and area studies master's candidates. Studies based on individual and program needs.

570. International Relations: Core Readings. (3)

Prerequisite: PISc 370 or equivalent.

Readings focusing on influential theories in international relations including realism, idealism, Marxism, neorealism, neoliberalism, etc.

599R. Academic Internship: International. (1-9)

Professional-level internship in an international setting. Class must be coordinated through Study Abroad.

600. Theory and Research in Social Science. (3)

Prerequisite: admission to MA program.

Epistemology, logic of inquiry, and modes of qualitative and quantitative research.

695R. Directed Individual Studies. (1-3)

697R. Seminar in International Studies. (1-3)

699R. Master's Thesis. (1-6)

FACULTY

See faculty listings under the following catalog entries:

Anthropology
Asian and Near Eastern
Languages
Economics
History
Marriott School
Organizational Leadership and Strategy
Political Science
Sociology

LANGUAGE ACQUISITION

Graduate Coordinator: Masakazu Watabe

4060 JKHB
Provo, UT 84602-6104
(801) 378-2945

THE PROGRAM OF STUDIES

The College of Humanities offers one collegewide degree in language acquisition: Language Acquisition—MA.

Generally not more than two students per language are admitted to the language acquisition program per year. Most students complete the degree within two years.

Language Acquisition—MA

This program offers professional preparation to students seeking careers in applied linguistics, foreign language education, computer-assisted language learning and instruction, and other related areas.

Students become familiar with current theories of second language acquisition and develop basic skills in applying that knowledge to teaching, testing, and classroom-oriented research in their language of specialization.

The program is quite flexible, with emphases varying according to students' interests and faculty members' expertise. It is ideally suited to the needs of the following types of students:

- Students who have completed undergraduate majors in foreign languages, applied linguistics, or related fields, and who are contemplating eventual careers in academics.
- Foreign language teachers at the secondary school level who wish to further their professional education and acquire more specialized competency in their fields.
- Students seeking the necessary preparation for advanced research and work in the field of high-

technology applications to language learning and instruction.

Students are admitted to the program with a specific language specialization in Arabic, Chinese, Finnish, French, German, Japanese, Korean, Portuguese, Russian, or Scandinavian.

Admission and Entry.

- Application deadline: February 1 (U.S. and international).
- Application requirements: entrance examination is GRE general test; fifteen-minute interview in the language of specialization addressing applicant's academic goals. May be completed in person, by telephone, or on tape in conversation with a second party.
- Sample of student's scholarly writing.
- Prerequisite: baccalaureate degree and strong background in the language of specialization.

Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours (699R).
- Required courses: Ling 540, 600, 641, 660, 677.
- Elective courses: 3 hours of advanced linguistic study of the language of specialization, plus 9 hours as approved by the graduate committee for a total of 12 hours.
- Language requirement: reading and speaking ability (202 level) in language other than English in addition to language of specialization.
- Thesis: 6 hours of 699R in language of specialization.
- Examination: oral defense of thesis.

FINANCIAL ASSISTANCE

Fellowships and full or partial tuition scholarships are available, depending on merit and funding. Applicants should contact the respective language department directly to apply for a teaching assistantship.

Limited funds are also available for participation in professional conferences.

RESOURCES AND OPPORTUNITIES

Humanities Research Center.

Students in the language acquisition program utilize the Humanities Research Center for world-class computer-assisted language instruction and translation.

The Foreign Language Student Residence.

Students who desire a more intensive language study experience and practical application of the language under the direction of faculty and native residents may apply to live in the Foreign Language Student Residence. All activities in the individual apartments in the residence are conducted in the foreign language. Housing is available for men and women in the languages of specialization. Graduate students may participate as students or as senior residents.

For a more detailed description of the graduate program requirements, send for a copy of the degree bulletin.

COURSE DESCRIPTIONS

See course descriptions under Linguistics section of this catalog and desired area of specialization.

FACULTY

Over thirty faculty members are associated with the program and are available for consultation, although the primary advisor is usually associated with the language of specialization. See faculty names and research interests under both the Linguistics section of this catalog and the various language departments.

J. REUBEN CLARK LAW SCHOOL

Dean: H. Reese Hansen

Associate Dean: J. Clifton Fleming, Jr.

Associate Dean: Constance K.

Lundberg

Associate Dean and Graduate

Coordinator: Scott W. Cameron

Assistant Dean: Kathy D. Pullins

342 JRCB

Provo, UT 84602-8001

(801) 378-6386

THE PROGRAM OF STUDIES

Students admitted to the highly competitive programs of the Law School receive a breadth and depth of training that prepares them to function in the wide range of activities that occupy the professional lawyer's life. Students gain firsthand experience with a variety of teaching and learning methods, among them Socratic or inductive teaching, problem solving, seminars, individual research, and clinical experience.

The specific objective of the curriculum is to maximize the student's mastery of legal reasoning and legal method—in addition to teaching a core of the basic substantive rules of law and imparting an appreciation for its institutions and traditions.

Students are taught to analyze complex factual situations; to separate the relevant from the irrelevant; and to reason inductively, deductively, and by analogy. Students are also schooled in the arts of written and oral advocacy.

Legal education at this school does not include the sponsorship of particular political objectives, except as may flow from loyalty to the United States Constitution and from a commitment to the highest ideals of personal character and individual liberty. These make up the foundation upon which an enduring legal system must rest.

Two degrees are offered through the J. Reuben Clark Law School: Law—

JD and Comparative Law—LLM. The university has also approved programs whereby qualified students can obtain a concurrent master's degree in business administration, public administration, accountancy, organizational behavior, or education or a doctorate in education while pursuing a law degree.

The Law School selects approximately 150 students each year for admission to the new class. The juris doctorate (JD) takes three years (six regular semesters) in residence to complete. The LLM students receive their degree on completion of 24 credit hours earned during at least two semesters in residence.

Law—JD

The J. Reuben Clark Law School offers a six-semester course of graduate professional study leading to the juris doctorate (JD) degree. Additional information about legal education, admissions standards, and procedures—including information about the Law School Admission Test (LSAT) and registration with the Law School Data Assembly Service (LSDAS)—can be obtained from the J. Reuben Clark Law School Bulletin, which is available through the admissions office of the Law School.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1. (Admissions are for fall semester only.) By the posted deadline, all parts of the completed application must have been received by the Law School Admissions Office, 340 JRCB, Provo, UT 84602-8000. To be considered complete, application must include the following:
 - Completed official Law School application form.
 - Check or money order for \$30 payable to Brigham Young University. (This is an application fee and is neither refundable nor credited toward tuition.)
 - Two completed evaluations from undergraduate teachers and one from a supervisor of work or service (including church, military, or

other) on Prospective Law Student Evaluation Forms included in the official application.

—Report of the applicant's interview with an LDS bishop, branch president, or mission president; religious leader of another faith; or judge of a court of general jurisdiction indicating the applicant's willingness to comply with the BYU Honor Code and standards of conduct.

—LSDAS Law School Report that includes transcripts and LSAT scores.

—A personal statement.

- Application requirements: to be admitted to the Law School, an applicant must be a college graduate who has excelled academically and has scored in the upper range of the nationally administered LSAT. In addition, applicants must meet the general university admission requirements, including the personal standards required of all students.
- Prerequisite: a bachelor's degree is required to ensure that the entering student has the soundest possible foundation for the study of law. Because the study of law ranges so broadly, no specific undergraduate major is required. The greater the student's diversity with the human experience, the better.
- Skills: ability to analyze, reason, read carefully, think in abstract terms, and express thoughts clearly and precisely.

Requirements for Degree.

- Credit hours (90): credits toward the JD degree must be earned by the end of ten regular BYU Law School semesters (five years) after a student has begun the study of law at an ABA-approved law school.
- Required courses: all first-year courses are required for graduation: Torts I and II, Contracts I and II, Civil Procedure I and II, Criminal Law, Property I and II, and Lawyering Skills I and II. Each student will then be required to take the professional responsibility

course during the second or third year.

- Legal paper: each student will be required to prepare, during his or her second or third year, a substantial paper of satisfactory quality.
- Legal research training: each student must complete ten days of legal research training before graduation.
- Residency requirement: graduation requires six regular semesters in residence. Enrollment in summer programs (ten semester hours spread over two summers) can reduce the number of regular semesters from six to five.
- Graduation interview: to be held with the director of student records and services four months prior to graduation.

Comparative Law—LLM

The J. Reuben Clark Law School created the Master of Law (LLM) Program in 1988 to provide an opportunity for lawyers trained in jurisdictions outside the United States to engage in a comparative study of the U.S. legal system with that of their home country. The program provides maximum exposure to the U.S. legal system and frequent interaction between master of law students and students seeking the juris doctorate degree. Students obtain a solid foundation in the basic principles of United States law while being allowed the flexibility to pursue personal academic interests. To ensure a superior educational experience for students in the program, admission is limited to eight applicants per year.

The master of law (LLM) degree is conferred upon successful completion of a minimum 24 credit hours earned during at least two semesters in residence following completion of a JD degree or its equivalent outside the United States.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1. (Admissions are for fall semester only.) By the posted deadline, all parts of the completed application

must have been received by the Law School Admissions Office. To be considered complete, the application must include the following:
—Completed application on the official Law School application form.

—Check or money order for \$30 payable to Brigham Young University. (This is an application fee and is neither refundable nor credited toward tuition.)

—Three completed evaluations from (1) two faculty members who taught the applicant in law school courses and (2) one other person who has supervised the applicant's academic or professional work or service.

—Report of the applicant's interview with his or her bishop, clergy, or judge of a court of general jurisdiction indicating the applicant's willingness to comply with the BYU Honor Code.

—Official transcripts of the applicant's academic record listing courses and corresponding grades and, if available, a statement of rank in class, the size of the class, and an explanation of the grading system used by the school. The official transcript and statement of rank must be submitted in English.

—If English is not the applicant's native language, reports of the TOEFL and TSE reports. A TOEFL score of at least 590 is required for admission to the program. If an applicant's TOEFL score is inadequate, he or she may be considered for conditional acceptance subject to successfully completing an intensive language course in an American university prior to beginning the program.

—Written statement explaining the applicant's reasons for wanting to pursue postgraduate studies in law and the applicant's career plans.

—Official verification of admission to the practice of law in the applicant's native country.

—Proof of the applicant's financial capability to be self-supporting while enrolled in the Law School.

- Application requirements: an applicant for admission to the LLM program must have completed either a period of law study at least substantially equivalent to that required of a graduate of an ABA-approved law school in the United States or another course of law study that has adequately prepared the student to pursue an LLM degree. The applicant must have completed the educational requirements for admission to the practice of law in his or her native country. In addition, applicants must meet the general university admission requirements, including the personal standards required of all students.

Requirements for Degree.

- Credit hours (24): credits toward the LLM degree must be earned during at least two regular BYU Law School semesters following completion of a JD degree or its equivalent outside the United States.
- Required courses: each student will be required to complete the 3-credit-hour Introduction to American Law course during the fall semester. (A student may satisfy this requirement during the summer preceding his or her enrollment at BYU by completing an introductory course for foreign students at the following schools: Georgetown, Florida, Wisconsin, or the University of Texas at Dallas.) Additionally, each student is required to complete two semesters in one of the regular first-year courses in the JD program. The course chosen to fulfill this requirement is determined by the student in consultation with his or her faculty-appointed advisor.
- Legal research training: each student must complete the legal writing and research course related to the first-year course selected.
- Written thesis: a student may earn up to 4 credit hours for a written thesis project supervised by an appointed thesis advisor and defended before that advisor and two additional readers. Although the written thesis is encouraged, it

is not required for completion of the LLM degree.

- The student chooses the remainder of his or her curriculum from the regular juris doctor course offerings.

Joint Master's Degrees— JD/MBA, JD/MPA, JD/MAcc, JD/MOB

Joint degrees with the JD are offered in business administration, public administration, accountancy, and organizational behavior in a duration of four academic years. The law program is ordinarily three years; the other programs are two. The four-year combination is possible because of subject areas of common interest to the programs. The first year is ordinarily spent in the Law School, the second year is devoted to the first two semesters of regular MBA, MPA, MAcc, or MOB programs, and the last two years are arranged to suit individual needs above the core requirements. Further inquiries can be sent to the Law School or to the Marriott School (for MBA, MPA, MAcc, and MOB programs). Address Marriott School correspondence to Marriott School, 730 TNRB, Provo, UT 84602-3113.

Note: Students entering one of the joint programs must meet the admission requirements of each degree.

Joint Education Degrees— JD/MEd, JD/EdD

The Law School and the McKay School of Education have established the joint JD degree and either a master of education or a doctor of education. The Law School will accept 6 hours of credit obtained in the master's program, or 9 hours of credit obtained in the doctoral program toward the JD degree. Direct inquiries to the Law School, not the McKay School of Education.

Note: Participants must meet the admission standards of each degree.

Joint Programs—JD/Master's

In special cases the Law School will accept credit earned in other graduate programs offered by the

university. The Law School has details about specific programs.

FINANCIAL ASSISTANCE

A number of scholarships and endowed awards are available to law students, as well as a variety of low-interest loans. Students interested in these opportunities should inquire at the Law School and the BYU Financial Aid Office.

Tuition and Fees. Tuition and fees must be paid before or at the time of registration. Since more than 50 percent of the cost of operating the Law School comes from the tithes of The Church of Jesus Christ of Latter-day Saints, students and the families of students who are tithe-paying members have already made a significant contribution to the university and are thus charged a lower tuition fee than nonmembers. This disparity is similar to the higher tuition charged by law schools of state universities to nonresidents.

Semester tuition: \$2,665 LDS
\$4,000 non-LDS

RESOURCES AND OPPORTUNITIES

J. Reuben Clark Law Building. One of the finest university law school facilities in the country, the J. Reuben Clark Law Building is attractively located on the eastern edge of the campus. Its five floors house nine classrooms, three seminar rooms, a student commons area, a student lunchroom, and ample spaces for student organizations and activities, as well as faculty offices and a law library.

Howard W. Hunter Law Library. Ranking now among the nation's largest law libraries, the Howard W. Hunter Law Library contains more than 400,000 volumes or equivalents available for student and faculty use. Besides the latest in technological facilities and services, the library also contains individual study carrels with hookups for computer access to networks. Law students also have access to the holdings in

the university library, the Harold B. Lee Library.

Cocurricular Programs. In addition to the Brigham Young University Law Review, law students publish the BYU Journal of Public Law and the Brigham Young University Education and Law Journal and participate in board of advocates and trial advocacy programs. The cocurricular programs extend law review experience to a larger number of students than would be possible through a single journal.

Other Special Programs. Students obtain experience in trial and appellate practice patterned after the old English Inns through the American Inn of Court I. Minority students may participate in annual summer institutes sponsored by the Council on Legal Education Opportunity and a scholarship program in law for American Indians funded by the Bureau of Indian Affairs.

Student Organizations. Within the Law School, students may participate in a number of organizations, among them the Student Bar Association, the Women's Law Forum, the Diversity Committee, the Minority Law Students Association, the Native American Law Students Association, the Natural Resources Law Forum, the Family Law Society, the Alternative Dispute Resolution Society, the Government and Politics Legal Society, the International and Comparative Law Society, the Intellectual Property Law Association, the Public Interest Law Foundation, the Federalist Society, and the Civil Rights Law Association. There is a chapter of a legal fraternity on campus and a Law Partners organization for spouses of married law students.

For a more detailed description of the graduate program requirements, send for a copy of the J. Reuben Clark Law School Bulletin.

COURSE DESCRIPTIONS

First Year Courses

Note: Some courses may not be offered every year.

505 and 506. Torts 1 and 2. (3 ea.)

Study of the judicial process in civil actions for damages or equitable relief for physical, appropriational, and defamatory harms to personality, property, and relational interests, with some consideration of alternative reparation systems such as workers' compensation and "no-fault" automobile insurance plans.

510 and 511. Contracts 1 and 2. (3 ea.)

Examination of the promises enforced by law, and the nature of the protection given. Inquiry made into the formation, performance, and discharge of contracts; their assignment, termination, and modification; and the variety, scope, and limitations on remedies. Article 2 of the Uniform Commercial Code.

515 and 516. Civil Procedure 1 and 2. (3 ea.)

Basic study of the operation of courts, including an introduction to the organization of state and federal courts and relationships between them. Topics include: jurisdiction over persons, things, and subject matter; venue; the scope of litigation as to claims, defenses, and parties; pleading, pretrial motions, discovery, and pretrial conferences; trials and the functions of judges, juries, and lawyers; appeals and the role of appellate courts; and the enforcement and finality of judgments and decrees.

520 and 521. Property 1 and 2. (3 ea.)

Inquiry into the nature of "property" and "ownership" of land and structures on land and the ways in which ownership may be established, restricted, transferred, and divided among various persons.

525. Criminal Law. (3)

Problems in defining what conduct should be subjected to criminal penalties; the limitations of criminal law as a means for prevention and control of undesirable conduct.

535 and 536. Legal Research and Writing 1 and 2. (1.5 ea.)

Fundamentals of good legal research, proper legal citation form, basic principles of legal analysis, elements of good writing style, legal memorandum drafting, appellate brief writing, and appellate advocacy. Research and writing exercises.

537. Legal Research 1. (0.5)

Prerequisite: admission to Law School

Fundamentals of legal research and legal citation format. Primary and secondary source materials. Effective methods for accessing and updating sources.

538. Legal Research 2. (0.5)

Prerequisite: Law 537.

Electronic legal research. Basic training on full-text legal research databases such as WESTLAW and LEXIS. Accessing legal materials using CD-ROM and Internet.

541. Public Interest Law. (2)

Lawyers' responsibilities and opportunities to use their specialized training to assist members of the public not adequately represented; various legal issues commonly encountered in pro bono and public interest work.

Second- and Third-Year Courses

599R. Externship. (1-12)

Prerequisite: first-year law courses.

- Legal Services
- Externship
- Pro Bono
- Cooperative Education

601. Advanced Legal Research. (2)

Prerequisite: first-year law courses.

Advanced legal research sources and methodologies.

602. Administrative Law. (3)

Prerequisite: first-year law courses.

Examination of the administrative process: why administrative agencies are created, how they obtain and use information, what proceedings (rule-making/adjudication) agencies can commence, and what controls (political/judicial) over agency action exist.

603. Criminal Procedure. (3)

Prerequisite: first-year law courses.

Problems in administering a system of criminal law; constitutional and policy limitations upon public officers in dealing with suspected, charged, and convicted offenders.

604. Advanced Legal Writing. (2)

Prerequisite: first-year law courses.

Study and application of sound writing techniques that are most challenging for lawyers. Extensive writing, editing, and classroom participation required.

Substantial writing option.

605. Antitrust. (3)

Prerequisite: first-year law courses.

Development of legal doctrine under the Sherman Act and supplemental legislation, including price fixing, division of market, monopolization, mergers, tying and exclusive dealing arrangements, boycotts, and special relationships between principles of patent and antitrust law. Emphasis: the relationships between principles of law and economics, examined in the context of certain key cases.

606. Anglo-American Legal History. (2)

Prerequisite: first-year law courses.

Survey of the legal systems and values introduced to the British Isles by successive invasions up to the eleventh century. From the eleventh century to modern times, a single area of legal developments will be considered to discern the impact of historical forces and societal values on the course of those developments, especially the divergence of English and American rules.

607. Law in the Bible, Book of Mormon, and Ancient Near East. (2)

Prerequisite: first-year law courses.

Comparative study of selected legal topics in the law codes of the Sumerians, Babylonians, Hittites, Assyrians, and Israelites, as well as legal cases in the Book of Mormon and the New Testament.

608. Law of Debtors and Creditors. (3)

Prerequisite: first-year law courses.

Exploration of our human condition as debtors and creditors.

609. Law and Religion. (3)

Prerequisite: first-year law courses.

Appropriateness of public action based on religious belief, with specific application to questions of abortion, same-sex orientation, gender discrimination, and pornography.

610. Business Associations. (3)

Prerequisite: first-year law courses.

Introduction to business associations, agency, uniform partnership acts, the essentials of corporate formation, shareholders rights, special problems of closely held businesses, preemptive rights, etc.

611. Advising Closely Held Business. (2)

Prerequisite: first-year law courses; Law 641.

Advanced work in partnerships, corporations, and federal taxation in the context of business planning and counseling. Based on readings and problems that consider a broad range of matters commonly faced by lawyers who advise closely held businesses, including: drafting partnership agreements, determining whether and how to incorporate, organizing the closely held corporation and preparing basic corporate documents, counseling the owners of an ongoing corporate business, working with accountants and other professional business advisors, arranging business financing, getting earnings out of a corporate business, forming professional corporations, and avoiding common malpractice and ethical problems. Course grade will be determined from performance on a series of document-drafting exercises.

612. Advanced Corporation Law. (3)

Prerequisite: first-year law courses.

Introduction to financial accounting and corporate finance, William Act regulation and reporting, fiduciary duties owed in complex transactions, shareholder litigation, indemnification and insurance, etc.

613. Community Lawyering. (3)

Prerequisite: first-year law courses.

Christian reconstruction of the lawyer's role in public life, especially how that role is performed among the disadvantaged.

615. Secured Transactions. (3)

Prerequisite: first-year law courses.

All aspects of security in personal property (personal property includes everything except land). Problems and legal principles relevant to the creation of the security interest, to its perfection, to priorities between competing security interests and between a security interest and other kinds of property interest, to payment and redemption, and to realization procedures. Article 9 of the Uniform Commercial Code.

616. Commercial Paper. (3)

Prerequisite: first-year law courses.

Negotiable instruments (checks, drafts, notes) under Articles 3 and 4 of the Uniform Commercial Code; letters of credit and electronic transfers.

618. Community Property. (2)

Prerequisite: first-year law courses.

Community property: the basic concept and underlying policies; initiation and existence of a marital community; property capable of community ownership; classification of property as community or separate; and property management and control.

619. Conflicts of Law. (2-3)

Prerequisite: first-year law courses.

Jurisdictional issues, choice of law, and recognition of judgments in cases involving interstate and state-federal conflicts.

620. Constitutional Law 1. (3)

Prerequisite: first-year law courses.

Constitutional structure of the federal republic, including problems of judicial review, justiciability, sources of limitations upon national and state power, interstate commerce, taxing and spending, intergovernmental relationships within the federal system, separation of powers, and procedural and substantive due process protection of individual rights.

621. Constitutional Law 2. (3)

Prerequisite: first-year law courses.

Relationship between government and the individual, focusing on equal protection and constitutional restraints on private conduct.

622. Selected Issues in Employment Law. (3)

Prerequisite: first-year law courses.

Employment discrimination: benefits, compensation, and hours; workplace safety and health.

623. Business Reorganization Under the Bankruptcy Code. (3)

Prerequisite: first-year law courses; Law 615 prior or concurrently.

Recommended: Law 610, 650 prior or concurrently.

Practical analysis of the law and policy underlying business reorganizations in Chapter 11 from filing the petition to confirming the plan.

625R. Evidence. (3 hours for M. Goldsmith's section, 4 hours for E. Kimball's section)

Prerequisite: first-year law courses.

Law of evidence, including principles governing admissibility of evidence, competency of witnesses, and function of lawyer, judge, and jury in presenting and evaluating evidence.

626. Constitutional Law 3. (3)

Prerequisite: first-year law classes.

Marbury v. Madison and judicial review; First Amendment issues.

628. Remedies. (3)

Prerequisite: first-year law courses.

General principles and basic rules governing the rich inventory of remedies available through American courts, which cuts across substantive fields and guides the lawyer in fashioning or defending against various remedial schemes in any substantive context. Issues and developments of contemporary importance, including public as well as private law remedies.

629. Advanced Corporation Law. (3)

Prerequisite: first-year law courses.

Application of corporation law in complex corporate transactions.

630. Criminal Trial Practice. (2)

Prerequisite: first-year law courses.

Develops the art and practical skill of trial advocacy. Typical situations that arise in the trial of a criminal case.

632. Family Law. (3)

Prerequisite: first-year law courses.

Overview of state regulation of family relations, emphasizing marriage and divorce, adoption, child custody, regulating the ongoing family, and selected constitutional issues.

633. Children and the Law. (2)

Prerequisite: first-year law courses; Law 632.

Issues relating to state regulation of parent-child relations, including children's rights, parent rights, juvenile courts, adoption, health decisions, educational decisions, child abuse and neglect, youth status offenses, and delinquency.

634. American Education Law and Policy. (2)

Prerequisite: first-year law courses.

Constitutional issues of public education: free speech, student conduct, teacher rights and discipline, equal access, special education, home schools, and religion in the public schools.

635. Federal Courts. (3)

Prerequisite: first-year law courses.

Fundamental structural questions regarding powers of the federal judiciary in relation to other branches of the national government and to state governments and courts. Core constitutional issues of the separation of powers and federalism of current importance to all law students. Foundation course for those contemplating a litigation career.

636. Federal Courts 2. (2)

Prerequisite: first-year law courses, Law 635.

A continuation of Law 635.

637. Advanced Estate Planning. (3)

Prerequisite: first-year law courses, Wills and Estates, Tax 1 and 2, Business Associations.

Effective disposition of wealth by *inter vivos* gift and testamentary transfer.

640. Federal Taxation 1. (4)

Prerequisite: first-year law courses.

Federal personal income tax, with an introduction to business and corporate income tax and federal tax procedure. Examining and understanding statutory, judicial, and administrative tax law and applying the law in solving specific problems.

641. Federal Taxation 2. (4)

Prerequisite: first-year law courses; Law 640.

Federal income tax consequences flowing from creation, operation, merger, dissolution, and sale of partnerships and corporations; federal tax considerations bearing on choice between conducting a business in partnership or corporate form.

642. Intellectual Property Law. (3)

Prerequisite: first-year law courses.

Fundamental principles of patentability and infringement, including a brief discussion of employment and noncompetition agreements for protecting inventions. Not limited to students with scientific degrees or those intending to emphasize patent law but prerequisite to Advanced Patent Prosecution and Claim Drafting.

643. U.S. Taxation of International Income. (2)

Prerequisite: first-year law courses; Law 640.

Application of the federal income tax to foreign income of U.S. citizens and residents and to the U.S. source income of foreigners. Purpose and operation of income tax treaties.

644. Insurance Law. (3)

Prerequisite: first-year law courses.

Major topics include types of insurance, presenting claim, interpreting the insurance contract, measures of recovery, rights to proceeds of insurance, potential defenses by the insurer, and rights and obligations of insurers and the insured.

645. Federal Indian Law. (3)

Prerequisite: first-year law classes.

Law of the federal government and the states respecting Native Americans and their land. Relationship of European discoverers and Native Americans during colonial period; Native American treaties, executive orders, and agreements; changing United States policy respecting Native Americans; federal, state, and tribal jurisdictions, civil and criminal; tribal courts; Native American hunting and fishing rights, water rights, and civil rights.

648. Workers' Compensation. (2)

Prerequisite: first-year law courses.

Substance and procedure of workers' compensation law. Coverage of workers' compensation system; medical, disability, and death benefits; administration of the system, including integration of workers' compensation with other accident benefits systems.

649R. Clinical Programs. (10)

Prerequisite: first-year law courses.

650. Real Estate Finance. (3)

Prerequisite: first-year law courses.

Review of real estate finance transactions, including mortgages, trust deeds, installment sales contracts, other mortgage substitutes, receiverships, transfer of real estate security interests, discharge, deeds in lieu of foreclosure, foreclosure, foreclosure sales, redemption, deficiency payments, priorities, mechanics liens, judgment liens, purchase money mortgages, and ground leases.

651. Law and Literature. (3)

Prerequisite: first-year law courses.

Literary and hermeneutic theory as they apply to interpreting the Constitution and cases decided thereunder.

652. Legislation. (3)

Prerequisite: first-year law courses.

Process by which policy is translated into statutory law and how that law is applied and interpreted, emphasizing legislative process, separation of powers, and statutory interpretation.

653. Interviewing and Counseling. (2)

Prerequisite: first-year law courses.

Theory and techniques of legal interviewing and counseling. Materials drawn from legal, psychological, and related literature.

655. Labor Law. (3)

Prerequisite: first-year law courses.

How collective bargaining relationships are established and how collective bargaining agreements are negotiated and administered in the private sector. Use of economic weapons, e.g., strikes, boycotts, and picketing.

656. Public Lands and Natural Resources. (3)

Prerequisite: first-year law courses.

Natural resources law in context of federal public lands. Topics covered include public land, law, water, hard-rock minerals, oil and gas leasing, timber, grazing and range management, wildlife, recreation, and environmental law.

658. Land-Use Planning. (3)

Prerequisite: first-year law courses.

Public and private limitation imposed upon and positive assistance provided for the use of private and public real estate. Includes land-use politics, administration, control, regulation, zoning, subdivisions, annexations, regulations, eminent domain, conservation, preservation, development, housing, economics, finance, and taxation. Public and private activities and action involved in land-use planning, control, and assistance.

659. Public International Law. (3)

Prerequisite: first-year law courses.

Nature of international law; bases of state jurisdiction; law of sea; law of air space; sovereign immunity; the individual in the international legal system; statehood and recognition of states; diplomatic and consular protection and immunity; international agreements.

660. Professional Responsibility. (2)

Prerequisite: first-year law courses.

Ethical and professional responsibilities of practicing lawyers. Model Rules of Professional Conduct.

661. Public Policy Negotiations. (3)

Prerequisite: first-year law courses.

Applying negotiation theories and skills to civil rights issues and public law conflicts. For students pursuing careers in public interest law, poverty law, or a public policy-oriented practice (e.g., environmental, education, housing, health-care issues).

662. Securities Regulation. (3)

Prerequisite: first-year law courses.

Recommended: Law 610.

Securities Act of 1933, Securities Exchange Act of 1934, state blue sky laws and regulations, distribution and trading of securities, express and implied civil liabilities, criminal liability, insider trading, tender offers, broker-dealer regulation, and liability of collateral participants and professional advisors.

663. State and Local Government

1. (3)

Prerequisite: first-year law courses.

Interrelationship among national, state, and local governments and the powers of each, as well as examination of separation-of-powers principles and impact of political process at state and local level.

665. Origins of the Constitution. (3)

Prerequisite: first-year law courses.

Review of drafting and adoption of Constitution and Bill of Rights; development of the ideas of the Constitution—what was intended and why.

666. Wills, Decedents' Estates, and Trusts. (4)

Prerequisite: first-year law courses.

Legal framework of private and charitable trusts as vehicles for the donative disposition of personal wealth. Family wealth transmission problems, intestate succession, wills and will substitutes, and the probate process.

667. Unfair Trade Practices. (2)

Prerequisite: first-year law courses.

Various remedies that competitors or dealers may pursue outside of or in addition to antitrust remedies.

668. Legal Negotiation and Settlement. (3)

Prerequisite: first-year law courses.

Theory and practice of negotiation. During the first four or five weeks, the emphasis is on learning (1) the functions of negotiation in the professional life of lawyers, (2) the negotiating skills and patterns of practicing lawyers (based upon empirical research and careful in-class analysis of videotapes of attorneys engaged in various negotiating situations), (3) the meaning and purposes of negotiations from the client's perspective, (4) some of the dynamics of negotiation as experienced during in-class group negotiating exercises, (5) why persons cannot be better negotiators than they are human beings, and (6) why development as a negotiator is a life-long process. During the remainder of the semester, class members prepare and negotiate approximately eight cases and transactions, including small and large cases in litigation as well as non-conflict-based business and commercial transactions.

670. Advanced Real Estate Transactions. (2)

Prerequisite: first-year law courses; Law 650.

Development and financing of subdivisions, condominiums, and income properties, as well as the impact of bankruptcy on real estate ownership and financing.

671. Oil and Gas. (2)

Prerequisite: first-year law courses.

Coverage of the following: nature of interests in oil and gas, oil and gas lease and associated problems, title and conveyancing problems with respect to transfers of oil and gas interests, and pooling and unitization.

672. North American Free Trade Agreement. (2)

Prerequisite: first-year law courses.

Introduction to NAFTA. Critical issues examined from perspective of Canada, Mexico, and the United States.

673. Selected Issues in Entertainment and Sports Law. (3)

Prerequisite: first-year law courses.

Introduction to the third largest industry in the United States, entertainment: mass media, movies, music, sports, and theatre. Limited number of legal issues discussed.

674. Law Practice Management. (2)

Prerequisite: first-year law courses.

Practice development, financial management, partnerships and other arrangements for law offices, setting fees, management of the law library, legal and nonlegal personnel, allocation of compensation.

675. Advanced Torts. (2)

Prerequisite: first-year law courses.

Tort actions and remedies for injuries to business, family, and political interests, including unfair competition, interference with contract, wrongful death and survival actions, loss of consortium, criminal conversation, alienation, malicious prosecution, abuse of process, and civil rights actions.

677. Advising Nonprofit and Tax-Exempt Organizations. (2)

Prerequisite: first-year law courses.

Practical and theoretical concerns in organizing and representing nonprofit or tax-exempt entities.

678. Social Policy and Feminist Legal Thought. (3)

Prerequisite: first-year law courses.

Feminist jurisprudence. Various doctrinal strains in development of feminist legal theory and method; applying them to facially neutral legal issues. Rape, domestic violence, employment discrimination, historical and sociological gender treatment, and practical changes in legal profession accompanying influx of greater numbers of women lawyers.

679. Alternative Dispute Resolution. (2)

Prerequisite: first-year law courses; Law 668.

Theory and practice of dispute resolution, emphasizing mediation, arbitration, and the various "hybrids" such as mini-trial, summary jury trial, and innovative uses of third-party neutral experts. Advising clients about pros and cons of these processes; skills lawyers must have to competently participate in them.

680. State and Local Government 2. (3)

Prerequisite: first-year law courses.

Recommended: Law 663.

Trends and perspectives in state and local government, emphasizing state and local control over, and federal limitation on, licensing, land use, and taxation, as well as state and local governmental liability under federal civil rights statutes.

681. Federal Estate and Gift Tax. (2)

Prerequisite: first-year law courses; Law 666.

Federal estate and gift tax, including basic estate-planning concepts.

682. Employee Benefit Plans. (2)

Prerequisite: first-year law courses.

Qualified and nonqualified plans (pensions, profit sharing, IRAs, ESOPs, medical benefits, etc.), including federal tax qualification issues, Department of Labor regulations, and fiduciary duties.

684. Water Law. (3)

Prerequisite: first-year law courses.

State, federal, and international law respecting water resources allocation, development, management, and conservation.

Substantial paper on transboundary-shared water resources regulation required.

685. Introduction to American Law. (3)

Prerequisite: first-year law courses.

Survey of basic concepts and institutions in the American legal system. For persons who have received their law degree or its equivalent from a university outside the United States.

Seminars

695R. Law School Seminar. (Arr.)

- Advanced Evidence
- Civil Trial Practice
- Comparative Church and State
- Computer-Based Practice Systems in Law
- Criminal Sentencing Guidelines
- Entertainment/Sports Law
- European Union Law
- Hazardous Materials Law
- Health Care
- In-Class Externship/Pro Bono Seminar
- In-Class Utah Legal Services Seminar
- International Commercial Arbitration
- Lawyering Skills
- Medical Malpractice
- Professional Seminar
- Real Estate Development
- RICO
- The Supreme Court

696R. Law School Seminar. (Arr.)

- Advanced Comparative Law
- Advanced Computer-Based Practice Systems in Law
- Advanced Negotiations
- Business Reorganization Under the Bankruptcy Code
- Civil Rights Actions
- Civil Trial Practice
- Comparative Constitutional Law
- Complex Crimes and Investigations
- Constitutional Interpretation
- Defense Function
- Domestic Relations Mediation
- In-Class Externship/Pro Bono Seminar
- In-Class Utah Legal Services Seminar
- Individual Employment Rights
- International Human Rights
- International Securities
- Legal Career Planning Lecture Series
- Patent Prosecution and Claim Drafting
- Professional Seminar
- United Nation's Conferences and Domestic Law

699R. LLM Thesis. (Arr.)

FACULTY

- AUGUSTINE-ADAMS, KIF**, *Associate Professor*. JD, Harvard, 1992. Torts; International Law.
- BACKMAN, JAMES H.**, *Professor*. JD, University of Utah, 1972. Land Use Planning; Real Estate Transactions; Real Property.
- BURNS, JEAN WEGMAN**, *Professor*. JD, University of Chicago, 1973. Antitrust; Commercial Law; Conflicts of Laws.
- DOMINGUEZ, DAVID**, *Professor*. JD, University of California, Berkeley, 1980. Criminal Law; Negotiations; Labor Law.
- DRIESSEN, MARGUERITE A.**, *Associate Professor*. JD, Stanford University, 1989. Criminal Law; Evidence; Sentencing Guidelines.
- DURHAM, W. COLE, JR.**, *Professor*. JD, Harvard University, 1975. Comparative Law; Constitutional Law; Criminal Law.
- ECHOHAWK, LARRY**, *Professor*. JD, University of Utah, 1973. Criminal Law; Public Lands and Natural Resources; Professional Responsibility.
- FARMER, LARRY C.**, *Professor*. PhD, Brigham Young University, 1975. Computer-Based Expert Systems in Law Practice; Law and Behavioral Science; Legal Interviewing and Counseling.
- FLEMING, J. CLIFTON, JR.**, *Professor*. JD, George Washington University, 1967. Business and Corporate Finance; Estate Planning; Federal Taxation.
- FLOYD, C. DOUGLAS**, *Professor*. LLB, Stanford University, 1967. Civil Procedure; Federal Courts; Antitrust.
- GEDICKS, FREDERICK M.**, *Professor*. JD, University of Southern California, 1980. Law and Religion; Constitutional Law; Legal Theory.
- GOLDSMITH, MICHAEL**, *Professor*. JD, Cornell University, 1975. Criminal Law; Criminal Procedure; RICO.
- GORDON, JAMES D., III**, *Professor*. JD, University of California, Berkeley, 1980. Contracts; Securities Regulation.
- HANSEN, H. REESE**, *Professor*. JD, University of Utah, 1972. Director, Clinical Studies. Wills; Estates and Trusts; Estate and Gift Tax.
- LEE, THOMAS R.**, *Professor*. JD, University of Chicago, 1991. Civil Procedure; Remedies.
- LUNDBERG, CONSTANCE K.**, *Professor*. JD, University of Utah, 1972. Environmental Law; Federal Courts; Natural Resources.
- MORGAN, THOMAS D.**, *Rex E. Lee Professor of Law*. JD, University of Chicago, 1965. Professional Responsibility; Regulated Industries.
- NEELEMAN, STANLEY D.**, *Professor*. JD, University of Denver, 1972. Wills and Estates; Taxation.
- PRESTON, CHERYL BAILEY**, *Professor*. JD, Brigham Young University, 1979. Debtor-Creditor Rights; Gender and Law; Commercial Law.
- RASBAND, JAMES R.**, *Associate Professor*. JD, Harvard, 1989. Torts, Water Law.
- SCHARFFS, BRETT G.**, *Professor*. JD, Yale, 1992. Business Associations; International and Business Transactions and International Securities.
- THOMAS, DAVID A.**, *Professor*. JD, Duke University, 1972. Federal Jurisdiction; Legal Bibliography, History, Research, and Writing; Real Property.
- WARDLE, LYNN D.**, *Professor*. JD, Duke University, 1974. Biomedical Ethics and Law; Conflict of Laws; Family Law.
- WELCH, JOHN W.**, *Professor*. JD, Duke University, 1975. Agency and Partnerships; Corporate Finance; Federal Taxation.
- WHITMAN, DALE A.**, *Professor*. LLB, Duke University, 1966. Property; Real Estate Finance; Land Use Planning.
- WILKINS, RICHARD G.**, *Professor*. JD, Brigham Young University, 1979. Antitrust; Civil Procedure; Federal Courts; Constitutional Law.
- WILLIAMS, GERALD R.**, *Professor*. JD, University of Utah, 1969. Office Practice; Remedies; Legal Negotiation and Settlement.
- WOOD, STEPHEN G.**, *Professor*. JD, University of Utah, 1969; JSD, Columbia University, 1980. Administrative Law; Employment Law; International Business Transactions.
- WORTHEN, KEVIN J.**, *Professor*. JD, Brigham Young University, 1982. Torts; Environmental Law.

LINGUISTICS

Chair: John S. Robertson
Graduate Coordinator: Lynn E. Henrichsen

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THE PROGRAM OF STUDIES

The Department of Linguistics has three primary academic thrusts: theoretical linguistics, computational linguistics, and language learning and teaching. In these areas the department offers two graduate degrees: a master's program in linguistics (which allows specialization in either computational or theoretical linguistics) and a master's program in teaching English to speakers of other languages (TESOL).

These graduate programs have seen constant growth over the years, partly owing to the intrinsic interest that the study of language holds and especially because of the unrelenting, worldwide demand for learning English as a second or foreign language. The three departmental emphases are complementary in the sense that one emphasizes linguistic theory, another focuses on applications of linguistic theory to teaching and learning, and the third emphasizes computer applications in both of these areas.

Two degrees and one certificate are offered through the Department of Linguistics: Linguistics—MA; TESOL Graduate Certificate; and TESOL—MA.

In addition to the above, the department is responsible for the following academic programs: Native American Languages, Austronesian Languages, and American Sign Language.

Linguistics—MA

The purpose of the linguistics MA program is closely related to the department's definition of linguistics, which is the scientific study of

language. The program aims to prepare the student to become a professional, prepared to go on to a PhD program if desired, or to go into the world as a competent practitioner of the skills expected of a linguist. A more applied, but popular emphasis in the department is a track that combines linguistics with computer skills. The education received includes such skills as analyzing language in its phonology, morphology, syntax, and semantics. It also introduces the student to such fields as sociolinguistics, anthropological linguistics, and especially computers and language if the student chooses to take that track. There are currently fourteen graduate students enrolled. Students average 3.4 years for completion.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer; February 1 (U.S. and international).
- Entrance examinations: GRE general test; for international applicants, the Departmental English Proficiency Exam and TOEFL, with a minimum score of 580.
- Prerequisite: Ling 330; high-competency (301 level or higher) in one foreign language, plus 12 credit hours in a second foreign language (one of these foreign languages must be non-Indo-European) or 12 credit hours in approved computer science courses; ESL 404 is required of all non-native English speakers.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Ling 699R).
- Required courses: Ling 450, 500, 521, 535, 540, 550, 630, 690, 699R, plus one 321-level foreign language class.
- Thesis.
- Examinations: oral defense of thesis (consult department for details).

TESOL—Graduate Certificate

The TESOL Graduate Certificate (which differs from state teacher certification or endorsement) prepares

the graduate to move into the TESOL profession. There are currently twenty-five graduate students in the TESOL Graduate Certificate Program. The average time for completion is 1.2 years.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer; February 1 (U.S. and international).
- Entrance examinations: GRE general test; for non-native speakers of English: TOEFL, with a minimum score of 580; Departmental English Proficiency Exam. Any deficiencies in English skills must be remedied to the satisfaction of the department before moving into the TESOL program.
- Prerequisite: Ling 230 and 330; ESL 404 is prerequisite for all nonnative English speakers. Ling 230, 330, and ESL 404 should be completed before or during the first semester of course work.

Requirements for Graduate Certificate.

- Credit hours: minimum 19 course work hours after 3–6 prerequisite hours.
- Required courses: Ling 540, 577, 579.
- Electives: 9 hours from Ling 500, 525, 531, 555, 565R, 572, 641, 660, 677, 678.

Teaching English to Speakers of Other Languages—MA

The master's program in TESOL has as its overall goal the preparation of students to become the professionals in the field of teaching English to speakers of other languages. Such study at the master's level provides appropriate preparation for further study at the PhD level, as well as success in the workaday world of teaching English as a second or foreign language. A graduate will be trained in teaching skills, teacher training, testing, writing, teaching reading, and scholarly research and writing. There are currently twenty graduate students enrolled, with an approximate average of 2.3 years for completion of the degree, including

time in the TESOL Graduate Certificate Program.

Admission and Entry.

- Application deadlines: application made upon completion of TESOL Graduate Certificate (see below).
- Application requirements: applicants must petition the department and be accepted by a review board. Students should not register for 600-level course work until notified of acceptance into the MA program.
- Prerequisite: completion of TESOL Graduate Certificate; intermediate-level proficiency in a modern foreign language (language courses may be taken concurrently with TESOL graduate courses); Ling 500 and acceptance of thesis prospectus; and evidence of graduate-level writing skills.

Requirements for Degree.

- Credit hours (37): minimum 31 hours (including 19 hours from TESOL Graduate Certificate) plus 6 thesis hours (Ling 699R).
- Required courses: Ling 540, 600, 695.
- Electives: 6 hours chosen from Ling 420, 521, 525, 531, 535, 550, 551, 555, 571, 572, 641, 677, 678, 679, Engl 529, CHum 489R.
- Thesis.
- Final oral examination: defense of thesis.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

FINANCIAL ASSISTANCE

Financial assistance has been increasing over the past several years, particularly in the form of tuition and partial tuition waivers. One of the benefits that comes to both linguistics and TESOL students is the fact that many professors use research assistants, who at the present time number about fourteen. Also, unique to the department for those studying TESOL is the opportunity to become a teaching assistant or part-time teacher at the English Language

Center, where there are about forty part-time teachers.

COURSE DESCRIPTIONS

521. Phonology. (3)

Prerequisite: Ling 330.

Discriminative values of speech sounds: their function in the communicative process. Analysis of phonological data via postulation of underlying forms and derivational rules.

525. Phonology of Modern English. (3)

Prerequisite: Ling 330 or equivalent.

Detailed phonetic and phonemic study of American English pronunciation, including theories and practices of teaching and acquiring pronunciation. Limited practicum included.

531. Grammar Usage. (3)

Prerequisite: Ling 330 or equivalent.

Examining English grammar and usage as they reflect different theories about language description and applying this knowledge in the ESL/EFL classroom. Limited teaching practicum included.

535. Semantics. (3)

Prerequisite: Ling 330.

Theory and practice of semantic analysis with special emphasis on Jakobsonian and Peircian semiotics.

540. Language Acquisition. (3)

Prerequisite: Ling 330 or equivalent.

First- and second-language acquisition viewed in light of psycholinguistics and sociolinguistics.

545. Psycholinguistics. (3)

Prerequisite: Ling 230 or equivalent.

How the mind interprets, stores, retrieves, and produces language. Some examination of anatomical structures and physiological processes of the brain dealing with language.

550. Sociolinguistics. (3)

Research and theory in anthropological linguistics and sociolinguistics.

551. Anthropological Linguistics. (3)

Language in culture and society: development, typology, and description.

555. Teaching Culture. (3)

What culture is, how it affects language learners and teachers, development of U.S. lifestyle patterns. Variety of readings.

558. Historical-Comparative Linguistics. (3)

Prerequisite: Ling 450 or equivalent.

Theory and method of language change via comparing daughter languages and reconstructing ancestral languages.

571. English as a Second Language K-12. (3)

Nature of language acquisition and strategies and materials designed to facilitate second language learning K-12.

572. TESOL Reading and Writing. (3)

Processes involved in reading and writing, emphasizing how these skills are developed in a second/foreign language. Limited teaching practicum included.

573. TESOL Literature. (3)

Teaching literature to nonnative English speakers, both TEFL and TESOL.

577. TESOL Methods and Materials. (4)

Foundation course surveying concepts, procedures, and techniques in second/foreign language teaching methodology and materials selection. Includes observation of actual classes and a mentored teaching practicum experience.

579. TESOL Student Teaching. (3)

Prerequisite: Ling 577 and departmental consent.

580R. Problems in Linguistics and Applied Linguistics. (1-3)

Advanced research in language acquisition, sociolinguistics, psycholinguistics, linguistics field study, applied linguistics.

590R. Readings in Linguistics. (1-3)

Prerequisite: instructor's consent.

Individual study of current linguistic literature. Occasional discussion sessions with instructor and other class members. Pass-fail grade only.

595. Research Prospectus Design. (1)
Prerequisite: admission to language acquisition or linguistics MA program; or provisional admission to TESOL MA program.

Procedures for developing research projects (including introduction and review of literature for MA thesis). Students may enroll concurrently for up to 2 hours of Ling 699R (thesis) credit.

599R. Academic Internship. (1-9)
On-the-job experience under faculty supervision.

600. Research Design and Bibliography. (3)
Prerequisite: Ling 595.

Analysis of the options in research design for examining language teaching and acquisition; basic statistics; use of computers in language research.

615. Analogical Modeling of Language. (3)
Prerequisite: Ling 330 or equivalent.

Nondeclarative approaches to language description; work within the connectionist or neural net framework; analogical or exemplar modeling.

630. Topics in Syntax. (3)
Prerequisite: Ling 430 or equivalent.

Theory of generative grammar, emphasizing its history, the competition between different versions of generative theory, and their recent extensions.

641. Interlanguage Analysis. (3)
Prerequisite: Ling 330 or equivalent.

Methods for comparing and analyzing aspects of languages as they relate to language acquisition and teaching, including aspects of phonology, lexicon, grammar, syntax, and discourse.

660. Language Testing. (3)
Construction, analysis, use, and interpretation of language tests.

677. Advanced Methodology. (3)
Prerequisite: Ling 577 or equivalent.

Advanced language-teaching methodology and its classroom application.

678. Advanced Materials Development. (3)
Prerequisite: Ling 577, 579.

Principles and procedures for designing, developing, and evaluating professional-quality language-teaching/learning materials of various types: textbooks, software, audiovisual aids, etc.

679. TESOL Supervision-Administration Internship. (3)
Prerequisite: instructor's consent.

Actual fieldwork in TESOL settings involving supervision, in-service training, and curricula-program study and administration.

690. Seminar in Linguistics. (2)
Prerequisite: Ling 630.
Advanced research and analysis of various linguistic problems.

695. TESOL Seminar. (1)
Prerequisite: completion of majority of TESOL MA courses; instructor's consent.

Integrating TESOL theory and practice; final preparation for TESOL career paths; refining and publicly presenting and defending thesis results.

699R. Master's Thesis. (1-9)

FACULTY

ANDERSON, NEIL J., Associate Professor. PhD, University of Texas, Austin, 1989. TESOL, Learning Styles and Strategies, Reading.

BROWN, CHERYL, Professor. PhD, University of California, Los Angeles, 1983. Second Language Acquisition; Discourse; Vocabulary; Methodology; Research Design and Statistics; TESOL.

GRAHAM, CHARLES R., Associate Professor. PhD, University of Texas, Austin, 1977. Second Language Acquisition/Attrition; ESL K-12; Spanish.

HALL, CYNTHIA, Assistant Professor. PhD, University of Arizona, 1991. Rhetoric; Lexicography; Philology.

HENRICHSEN, LYNN E., Professor. EdD, University of Hawaii, 1987. TESOL; Methodology; Materials Development; Teacher Education; ESL K-12; EFL.

LONSDALE, DERYLE, Assistant Professor. PhD, Carnegie-Mellon University, 1997. Formal Syntax and Semantics; Computational Linguistics; Salish Languages.

LUTHY, MELVIN J., Professor. PhD, Indiana University, Bloomington, 1967. Phonology; Syntax; Finnish.

MANNING, ALAN, Assistant Professor. PhD, Louisiana State University, 1988. Linguistics Theory; Syntax.

MELBY, ALAN K., Professor. PhD, Brigham Young University, 1976. Computer Aids for Translators; Syntax; French.

ROBERTSON, JOHN S., Professor. PhD, Harvard University, 1976. Historical Linguistics; Semiotics; Mayan Languages.

SHELLEY, MONTE F., Assistant Professor. PhD, Brigham Young University, 1983. Text Retrieval and Analysis; Instructional Science; Instructional Evaluation.

TANNER, MARK, Assistant Professor. PhD, University of Pennsylvania, 1991. Language Acquisition; TESOL, Sociolinguistics.

The following are linguists in language departments who frequently teach linguistics courses in their own disciplines or in the Department of Linguistics and who also serve on graduate and other committees for the Linguistics Department:

Asay, Devin—Computer Applications

Baltes, Paul—English

Belnap, R. Kirk—Arabic

Bourgerie, Dana—Chinese

Buonforte, Richard—Anthropology

Bush, Charles—Computer Applications

Chapman, Don—English

Christensen, Matthew—Chinese

Clegg, Halvor—Spanish

Eggington, William—English

Fails, Willis C.—Spanish

Hallen, Cynthia—English

Hart, David Kay—Russian

Hendricks, Harold—Computer Applications

Jarvis, Donald—Russian
 Jones, Randall L.—German
 Larson, Jerry—Spanish
 Lund, Randall—German
 Mathews, Thomas J.—Spanish
 Meredith, R. Alan—Spanish
 Oaks, Dallin D.—English
 Parkinson, Dilworth B.—Arabic
 Russell, Robert A.—Japanese and Arabic
 Skousen, Royal—English
 Smith, Kim—Computer Applications
 Smith, Melvin—Computer Applications
 Teemant, Annala—Teacher Education
 Turley, Jeffrey S.—Spanish
 Warnick, Paul—Japanese
 Watabe, Masakazu—Japanese

MATHEMATICS

Chair: Wayne W. Barrett
Associate Chair: Gurcharan S. Gill
Graduate Coordinator: David G. Wright

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THE PROGRAM OF STUDIES

The Department of Mathematics has approximately forty graduate students, most of whom are supported by teaching assistantships for which they receive tuition support as well as a stipend for providing teaching support in college algebra and calculus.

Three degrees are offered through the Department of Mathematics: Mathematics—MS; Mathematics—MA; and Mathematics—PhD.

MS and MA students study mathematics courses in preparation for careers in business, industry, government, or education. Other students use a master's degree in mathematics in preparation for a doctoral degree in mathematics or a closely related discipline or a discipline where technical competence is appreciated. Master's students graduate in an average of two years.

The department supports from ten to twelve PhD students. Designed for gifted and dedicated students, the program requires about four years past a master's degree. The department has special strength in the areas of applied mathematics, algebraic geometry, analytic number theory, geometric topology and group theory, and linear analysis.

Mathematics—MS

The master of science is designed to prepare students for positions in business and industry. It also provides preparation for further graduate study leading to a doctoral degree.

Information for Degree—Thesis and Nonthesis Programs. Graduate mathematics courses: approved graduate mathematics courses include all classes numbered 500 and above with the exceptions of 501, 502, and 629. Faculty sponsor: the graduate coordinator will assign each student a faculty sponsor on admission to the graduate program. Students should communicate with the sponsor as soon as they arrive on campus.

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, spring, summer, March 1 (U.S. and international).
- Entrance examinations: GRE general test and subject test in mathematics. Every international applicant whose native language is not English is required to submit Test of English as a Foreign Language (TOEFL) scores.
- Prerequisite: credit at least equivalent to BYU requirements for a baccalaureate degree in mathematics; a year's sequence in abstract algebra; and a year's sequence in advanced calculus.

Requirements for Degree—Thesis Program.

- Credit hours (30): minimum 24 course work hours in approved graduate mathematics including 12 hours in courses numbered 600 or above and 6 thesis hours (Math 699R).
- Examination: pass a written master's examination. The examination should be passed by the end of the student's first semester of the second year, after which two more attempts are allowed.
- Thesis.
- Oral defense of thesis.

Requirements for Degree—Nonthesis Program.

- Credit hours: Traditional Mathematics Option (32): minimum 30 course work hours in approved graduate mathematics including 18 hours in courses numbered 600 or above and 2 project hours (698R).

Minor Option (35): minimum 24 course work hours in approved graduate mathematics including 6 hours in courses numbered 600 or above, 9 hours in an approved minor, and 2 project hours (698R).

Applied Option (38): minimum 24 course work hours in approved graduate mathematics including 6 hours in courses numbered 600 or above, 12 hours in areas related to applications of mathematics, and 2 project hours (698R). The 12 hours of application must be approved by the graduate coordinator.

- Project and presentation: write a paper on an area of advanced mathematics and give a 45-minute presentation based on the paper.
- Examination: pass a written master's examination. The examination should be passed no later than the end of the first semester of the second year, after which two more attempts are allowed.

Mathematics—MA

The MA curriculum is designed to prepare students for teaching mathematics in a secondary school, or for a doctoral program in mathematics education.

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, spring, summer, March 1 (U.S. and international).
- Entrance examination: GRE general test and subject test are recommended (required for international applicants).
- Prerequisite: credit at least equivalent to current BYU requirements for a BA degree in education with a teaching major in mathematics or a BA degree in mathematics.

Requirements for Degree—Thesis Program.

- Credit hours (30): minimum 24 course work hours and 6 thesis hours (Math 699R).
- State teacher certification (required certification courses may not be part of the graduate program).
- Examination: pass a written master's examination. The examination should be passed by the end

of the student's first semester of the second year, after which two more attempts are allowed.

- Required courses: Math 316, 372 (if not taken as undergraduate classes), 629; any two-semester 500 or 600 sequence.
- Minor (optional): any approved minor.
- Thesis.
- Oral defense of thesis.

Requirements for Degree—Nonthesis Program.

- Credit hours (32): minimum 30 course work hours and 2 project hours (698R).
- State teacher certification (required certification courses may not be part of the graduate program.)
- Examination: pass a written master's examination. The examination should be passed by the end of the student's first semester of the second year, after which two more attempts are allowed.
- Required courses: Math 316, 372 (if not taken as undergraduate classes), 629; any two-semester 500 or 600 sequence.
- Minor (optional): any approved minor
- Project and presentation: write a paper on an area of advanced mathematics or mathematics education and give a 45-minute presentation based on the paper.

Mathematics—PhD

The doctoral program prepares students for a career in research and teaching at the university level or in basic research in a nonacademic setting.

Admission and Entry.

- Semesters of entry and application deadlines: fall, winter, spring, summer, March 1 (U.S. and international).
- Entrance examinations: GRE general test and GRE subject test in mathematics. Every international applicant whose native language is not English is required to take the Test of English as a Foreign Language (TOEFL).
- Prerequisite: undergraduate degree in mathematics or its equivalent;

one year of mathematical analysis (or advanced calculus); one year of abstract algebra, including linear algebra.

Requirements for Degree.

- Credit hours (54): minimum 36 course work hours in mathematics courses numbered 600 or above with a grade of B or better in each, plus 18 dissertation hours (Math 799R).
- Required courses: complete at least 3 hours each in algebra, analysis, applied mathematics, and geometry/topology.
- Examinations:
Written Examinations: at the beginning of the second year, pass examinations in three of the four areas of algebra, analysis, applied mathematics, and geometry/topology. Four hours are allotted to each examination. A failed examination may be repeated once at the beginning of the winter semester of the student's second year, after which permission must be obtained from the department graduate committee to retake the examination. Passed examinations need not be repeated. Syllabi are available for each examination.
Oral Examination: pass an oral qualifying examination covering the background necessary for research in a specific area. The student, having chosen a research advisor approved, will, with the advisor, outline suitable examination topics. These topics must be approved by an examination committee of three (including advisor) appointed by the department graduate committee, which conducts the examination.
Defense of Dissertation: a final oral defense of the dissertation is conducted by a faculty committee consisting of the student's research advisor, two other readers of the dissertation (one of whom may be an outside examiner) and two other members of the faculty.
- Language requirement: demonstrate proficiency in two approved foreign languages that are currently in major use in the mathematical

literature. At present the approved languages are French, German, Russian, and Italian. Another language in certain cases may be substituted for one of these if the department graduate committee approves. The committee will consider the current usage of the language in the student's specialty area. The examinations are offered by the Mathematics Department twice a year. They are designed to test a student's ability to translate, with the aid of a dictionary, mathematical literature into scientifically correct English.

- Dissertation.

FINANCIAL ASSISTANCE

Most of the graduate students in mathematics are supported by teaching assistantships. The usual load for a TA is two 3-hour sections (6 hours) both fall and winter semesters. The usual load for a PhD candidate acting as a TA is two 3-hour sections for one semester and one 3-hour section the second semester (if the student is making adequate progress on the qualifying exams. Current TAs receive from \$10,000 to \$12,000 per academic year as well as tuition support.

RESOURCES AND OPPORTUNITIES

Faculty research interests currently include: algebraic geometry; combinatorial group theory; geometric group theory; geometric topology; linear algebra; mathematics education; matrix analysis; number theory; and partial differential equations.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

501. Real Numbers. (3)

Prerequisite: Math 371.

Extensive examination of various axiomatic descriptions of the real numbers and interrelationships among these descriptions.

502. Set Theory. (3)

Prerequisite: Math 371.

Zermelo-Fraenkel axioms for set theory, the axiom of choice, ordinal and cardinal numbers, and algebra of sets.

511. Numerical Methods for Partial Differential Equations. (3)

Prerequisite: Math 311, 343; 213 or 434. Recommended: Math 347.

Finite difference and finite volume methods for partial differential equations. Stability, consistency, and convergence theory.

512. Numerical Analysis. (3)

Prerequisite: Math 311, 343, or instructor's consent.

Numerical matrix algebra, orthogonalization and least squares methods, unsymmetric and symmetric eigenvalue problems, iterative methods, Lanczos methods, advanced solvers for partial differential equations.

513R. Advanced Topics in Applied Mathematics. (3)

Prerequisite: instructor's consent.

521, 522. Methods of Applied Mathematics. (3 ea.)

Prerequisite: Math 334, 343; or equivalents.

Survey of current methods, continuous and discrete, including linear algebra, estimation, differential equations of equilibrium, eigenvalue and initial value problems; finite element, spectral, transform and difference methods; Fourier series, the Fourier matrix, fast Fourier transform; convolution.

530. Calculus of Variations. (3)

Prerequisite: Math 334, 343; or equivalents. Recommended: Math 347, 541.

Euler-Lagrange equation, sufficient conditions, Hamilton's principle of least action, Dirichlet's principle; applications to mechanics, geometry, economics, eigenvalue problems, direct methods.

532. Complex Analysis. (3)

Prerequisite: Math 332 or instructor's consent.

Theory of complex analysis at the beginning graduate level. Topics: Cauchy integral equations, Riemann surfaces, Picard's theorem, etc.

541, 542. Real Analysis. (3 ea.)

Prerequisite: Math 214, 315, 343 for 541; Math 541 for 542.

Rigorous treatment of differentiation and integration theory, Lebesgue measure, Banach spaces.

543. Advanced Probability. (3)

Prerequisite: multivariable calculus. Recommended: Stat 341 or 520.

Combinatorial methods, random walk, Markov chains, stochastic processes.

547. Partial Differential Equations. (3)

Prerequisite: Math 214, 334; or equivalents.

Topics from elliptic equations, heat equations; wave equations, stability, Fourier methods, energy methods, existence of solutions, etc.

551, 552. Introduction to Topology. (3 ea.)

Prerequisite: Math 315 for 551; Math 551 for 552.

Axiomatic treatment of linearly ordered spaces, metric spaces, arcs, and Jordan curves; types of connectedness.

561, 562. Introduction to Algebraic Geometry. (3 ea.)

Prerequisite: Math 671 or concurrent enrollment.

Projective varieties, curves, surfaces, differential forms, and divisors.

570. Matrix Analysis. (3)

Prerequisite: Math 343; or 212, 213; or equivalents.

Special classes of matrices, canonical forms, matrix and vector norms, localization of eigenvalues, matrix functions, applications.

621, 622. Matrix Theory. (3 ea.)

Prerequisite: Math 585

Zero-one matrices, spectra of graphs, Laplacian matrix, irreducible and primitive matrices, cycle expansion of the determinant, matrix completion problems, permanents, generalized matrix functions.

629. Teaching Mathematics in Secondary Schools. (3)

631, 632. Complex Analysis. (3 ea.)

Prerequisite: Math 332, 542 for 631; Math 631 for 632.

634, 635. Theory of Ordinary Differential Equations. (3 ea.)

Prerequisite: Math 315, 334.

641, 642. Functions of Real and Complex Variables. (3 ea.)

Prerequisite: Math 542 or instructor's consent for 641; Math 641 for 642.

643R. Special Topics in Analysis. (3)

Prerequisite: Math 642.

Continued fractions, stochastic processes, generalized functions, etc.

644. Harmonic Analysis. (3)

Prerequisite: Math 532, 542.

Harmonic analysis on the torus and in Euclidean space; pointwise and norm convergence of Fourier series and functional-analytic aspects of Fourier transforms emphasized.

645, 646. Functional Analysis. (3 ea.)

Prerequisite: Math 641 for 645; Math 645 for 646.

647, 648. Theory of Partial Differential Equations. (3 ea.)

Prerequisite: Math 347, 542 for 647; Math 647 for 648.

651, 652. General Topology 1, 2. (3 ea.)

Prerequisite: Math 552.

655. Algebraic Topology 1. (3)

Prerequisite: instructor's consent.

656. Algebraic Topology 2. (3)

Prerequisite: Math 655.

663, 664. Algebraic Geometry. (3 ea.)

Prerequisite: Math 672; Math 676 or concurrent enrollment.

Varieties, sheaves, and schemes; their cohomology and classification; applications.

671, 672. Algebra. (3 ea.)

Prerequisite: Math 372 for 671; Math 671 for 672.

675R. Special Topics in Algebra. (3)

Prerequisite: Math 672.

676. Commutative Algebra. (3)

Prerequisite: Math 671, 672.

Commutative rings, modules, tensor products, localization, primary decomposition, Noetherian and Artinian rings, application to algebraic geometry and algebraic number theory.

677. Homological Algebra. (3)

Prerequisite: Math 671, 672.

Chain complexes, derived functors, cohomology of groups, ext and tor, spectral sequences, etc. Application to algebraic geometry and algebraic number theory.

687R. Topics in Analytic Number Theory. (3)

Prerequisite: Math 387, 372, 532, and instructor's consent.

Current topics of research interest.

688R. Topics in Algebraic Number Theory. (3)

Prerequisite: Math 372, 387, and instructor's consent.

Current topics of research interest.

695R. Readings in Mathematics. (1-2)

698R. Master's Project. (2)

699R. Master's Thesis. (1-9)

751R. Advanced Special Topics in Topology. (3)

Prerequisite: instructor's consent and Math 651, 652.

Current topics in topology of research interest.

799R. Doctoral Dissertation. (Arr.)

FACULTY

ARMSTRONG, GERALD M., Associate Professor. PhD, University of Wisconsin, Madison, 1971. Real Analysis.

BAKER, ROGER C., Professor. PhD, University of London, 1971. Number Theory.

BARRETT, WAYNE W., Professor. PhD, New York University, 1975. Matrix Theory; Graph Theory; Combinatorics.

BATES, PETER W., Professor. PhD, University of Utah, 1976. Nonlinear Partial Differential Equations; Dynamical Systems.

CANNON, JAMES W., Professor. PhD, University of Utah, 1969. Geometric Topology; Geometric Group Theory.

CARDON, DAVID A., Assistant Professor. PhD, Stanford University, 1996. Number Theory.

CHAHAL, JASBIR S., Associate Professor. PhD, Johns Hopkins University, 1979. Number Theory.

CLARK, DAVID A., Assistant Professor. PhD, McGill University, 1992. Number Theory.

CONNER, GREGORY R., Assistant Professor. PhD, University of Utah, 1992. Geometric Group Theory; Combinatorial Group Theory; Topology.

FEARNLEY, LAWRENCE, Professor. PhD, University of London, 1970. Topology.

FORCADE, RODNEY W., Professor. PhD, University of Washington, 1971. Combinatorics.

GARNER, LYNN E., Professor. PhD, University of Oregon, 1968. Geometry; Commutative Algebra; Number Theory; Calculus Reform; Technology in Education.

GILL, GURCHARAN S., Professor. PhD, University of Utah, 1965. Functional Analysis.

HUMPHRIES, STEPHEN P., Associate Professor. PhD, University of Wales, 1983. Low-Dimensional Topology; Classical Groups.

JARVIS, TYLER J., Assistant Professor. PhD, Princeton University, 1994. Algebraic Geometry.

LAMOREAUX, JACK W., Professor. PhD, University of Utah, 1967. Topology.

LANG, WILLIAM E., *Professor. PhD*, Harvard University, 1978. Algebraic Geometry.

LAWLOR, GARY, *Associate Professor. PhD*, Stanford University, 1988. Minimal Surfaces.

LU, KENING, *Associate Professor. PhD*, Michigan State University, 1988. Applied Mathematics; Nonlinear Partial Differential Equations; Dynamical Systems.

McKAY, STEVEN M., *Assistant Professor. PhD*, Colorado State University, 1990. Numerical Analysis.

OUYANG, TIANCHENG, *Associate Professor. PhD*, University of Minnesota, 1989. Partial Differential Equations.

PETERSON, BLAKE W., *Assistant Professor. PhD*, Washington State University, 1993. Mathematics Education.

POLLINGTON, ANDREW D., *Professor. PhD*, University of London, 1978. Number Theory.

SKARDA, R. VENCIL, *Associate Professor. PhD*, California Institute of Technology, 1965. Functional Analysis.

SMITH, WILLIAM V., *Professor. PhD*, University of Utah, 1978. Spectral Theory.

SNOW, DONALD RAY, *Professor. PhD*, Stanford University, 1965. Calculus of Variations; Functional Equations; Combinatorics.

SPEISER, ROBERT DAVID, *Professor. PhD*, Cornell University, 1970. Algebraic Geometry; Commutative Algebra.

SWENSON, ERIC L., *Assistant Professor. PhD*, Brigham Young University, 1993. Geometric Group Theory.

TOLMAN, L. KIRK, *Associate Professor. PhD*, University of New Mexico, 1972. Graph Theory; Combinatorics; Ordered Rings and Fields; Differential Equations.

WALTER, CHARLES N., *Associate Professor. PhD*, University of New Mexico, 1970. Algebraic Geometry; Ordered Fields; Mathematics Education.

WILLIAMS, STEVEN R., *Associate Professor. PhD*, University of Wisconsin, Madison, 1989. Mathematics Education.

WRIGHT, DAVID G., *Professor. PhD*, University of Wisconsin, Madison, 1973. Geometric Topology.

WYNN, JAN EUGENE, *Associate Professor. PhD*, Colorado State University, 1972. Padé Approximations.

MECHANICAL ENGINEERING

Chair: Alan R. Parkinson
Graduate Coordinator: Craig C. Smith

242-M CB
 Provo, UT 84602-4102
 (801) 378-2625

THE PROGRAM OF STUDIES

Mechanical engineering is a profession that provides broad service to society, whether in the development of new automobiles or in space exploration. All over the world the demand for technical knowledge and well-engineered products and services increases at phenomenal rates.

Postbaccalaureate education in engineering increases the engineering student's possibilities of becoming an integral part of this flourishing world of increasing engineering and technology needs. Among significant new experiences awaiting those who choose to return for advanced study is a closer and more personal relationship with the faculty. Research projects usually involve one-on-one collaboration with faculty members. Many graduate courses are synthesis classes, where the student has the opportunity to consolidate previous knowledge and bring together interdisciplinary aspects of design and research. Technical confidence and subject mastery can be greatly increased.

The Mechanical Engineering Department's goal is to provide the best advanced education possible for design, creative research, and synthesis, enhanced by the spiritual atmosphere of the LDS Church-based culture.

Two degrees are offered through the Department of Mechanical Engineering: Mechanical Engineering—MS and Mechanical Engineering—PhD.

Some twenty to thirty new graduate students are admitted each year. Program duration depends on the degree sought and how much a student works. Nominal durations are 1.5 years for an MS degree and four years beyond a BS for a PhD.

Mechanical Engineering—MS

The MS degree can be directed toward research into new engineering knowledge or practice as well as advanced methods of engineering design.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 15 (U.S. and international); winter, September 15 (U.S. and international).
- Entrance examinations: international applicants must submit GRE general test and engineering subject test as well as TOEFL scores. U.S. applicants must prove to the department that they have passed the state fundamentals of engineering (FE, formerly EIT) examination, which the state of Utah (or any other state) offers each April and October.
- Prerequisite: BS degree in mechanical engineering or an allied discipline with approval; 3.0 GPA or above in last 60 hours for regular admission.

Requirements for Degree.

- Credit hours (34–40):
Thesis Option: minimum 30 hours including 6 thesis hours (MeEn 699R) and 6 hours of advanced mathematics or equivalent.
Nonthesis Option: minimum 39 course work hours including 6 hours of advanced mathematics or equivalent. A maximum 3 hours of project work, such as 695R, may be included in the 39-hour total.
- Study list: each student must submit a study list of approved courses during the first semester.
- Prospectus: each student on the thesis option must submit a prospectus before beginning significant work on the thesis, preferably during the first semester.

- Annual review: after the first year students must have an annual progress review with their committee.
- Residency requirements: residency is required for the major part of the work toward the master of science thesis. This work must be completed under the specific direction of a graduate faculty member while the student is in residence at BYU (at least two consecutive full-time semesters). "In residence" is defined as (1) being registered for credit as a graduate student and (2) living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty. Further, all work applying toward any master's project or thesis must be completely open for university review and publication. Any exceptions to the above must be supported by written approval from the department and college and obtained in advance of any work being performed.
- Examinations: FE examination or GRE (if not taken at time of admission); oral defense of thesis for thesis option candidates.
- Time requirement: one calendar year minimum.
- 3.0 minimum GPA in graduate study.

Engineering Management—Minor

Offered to MS students in the College of Engineering and Technology, the engineering management minor provides a way to include some elements of modern management in a technical graduate program.

Requirements.

- The minor requires 9 hours selected from the following courses: Mgt 501, 511, 541, 561, 562, 565, 580, or approved Marriott School graduate courses.
- Students should carefully plan how they will meet the requirements of the minor since these courses are taught only once a year.

This minor should be declared as part of a student's graduate study list. Admittance approval to enroll in class will be derived from approved graduate study lists.

Mechanical Engineering—PhD

Study at the PhD level intensifies as faculty relationships become more professional and intense, often resulting in close friendships. Course work can be even more stimulating as it becomes apparent that material is not necessarily laid out neatly. Sometimes questions are raised without formal answers. This often leads to individualized research that raises technical maturity.

The PhD program is directed toward the creation of new knowledge. Each dissertation is expected to be a defense of new engineering practice, design, or knowledge and is expected to result in peer-reviewed archival publications. It is in this program that the excitement of new knowledge frontiers are examined and placed before the world.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 15 (U.S. and international); winter, September 15 (U.S. and international). U.S. applicants—entry all terms and semesters; international applicants—fall semester entry preferred.
- Entrance examinations: FE (score of 70 percent) or GRE general test and advanced engineering subject test; TOEFL (score of 577 minimum).
- Prerequisite: BS degree (or equivalent) in mechanical engineering from a program accredited by the Accreditation Board for Engineering and Technology (ABET) with a minimum 3.0 GPA in the last 60 hours of technical and scientific course work. A BS in any other field requires provisional admission. Consult the department for specific details.

Requirements for Degree.

- Credit hours: a minimum 66 credit hours beyond the baccalaureate degree, which may include up to

18 hours of dissertation credit and 30 hours of combined master's course work and thesis credit (by committee approval) and must include 9 total credit hours of approved math and statistics. Students who have completed an MS degree may not apply any additional undergraduate credit toward the PhD. However, up to 6 undergraduate credits may be applied to the PhD if taken as part of the MS degree or if taken by students who are not receiving a master's.

- **Study list:** a study list must be submitted during the first semester of doctoral study.
- **Residency requirements:** same as mechanical engineering MS residency requirements.
- **Comprehensive qualifying examination:** a written examination must be taken within the first year of the PhD program (it may be retaken only once). Exams are offered in March and September of each year. Students should notify the graduate coordinator one month in advance of their intention to take an exam.
- **Prospectus:** a written prospectus must be submitted and defended orally before the dissertation committee at least one year prior to the oral dissertation defense.
- **Dissertation:** a minimum 18 hours of dissertation credit.
- **Oral defense of dissertation.**

Integrated Master's Program—BS/MS

Students who desire to obtain a master's degree in engineering, and who have been accepted to a department professional program, may elect to enter the integrated master's program at the end of the sophomore year or during the junior year of the engineering curriculum. The purpose of the program is to afford greater flexibility in scheduling course work than is normally available through a traditional BS degree followed by an MS degree program.

In this program the BS degree must be received simultaneously with the MS degree. Specific requirements are

the same as those listed for the mechanical engineering MS but include the following:

Admission and Entry.

- **Application deadlines:** formal application for admission to the program must be submitted to the Office of Graduate Studies at beginning of the junior year. Admission to graduate school must occur before taking the final 30 hours of course work. Application to graduate school must meet usual university graduate application deadlines.
- **Application requirements:** cumulative 3.0 GPA for previous 60 hours of course work.

Requirements for Degree.

- **Cumulative 3.0 GPA or above** in all courses to be counted toward master's degree.
- **Study list:** for both BS and MS programs must be filed at beginning of junior year.

Interdisciplinary Product Development—MS/MBA

In conjunction with the Marriott School, the Mechanical Engineering Department offers a two-year program in interdisciplinary product development (IPD) leading to the awarding of both a master of science in mechanical engineering and a master of business administration. The degrees are separately approved and granted by each department.

The IPD program was created to address the need for engineers, designers, and business managers to excel in world-class product development. It includes a course sequence, projects, industrial interaction, and research in interdisciplinary methods. A central focus of the program will be a large-scale product development project sponsored by an industrial partner and coached by an interdisciplinary faculty team. The industrial partner provides fellowship funds.

Participation in the program requires independent admission to both the MBA and the mechanical engineering MS programs. Mention should

be made in the statements of intent for each program that the applicant will pursue the IPD emphasis.

Upon admission to both departments, the student is required to submit to the IPD program a separate brief application, available from the Mechanical Engineering Department. The application requires a portfolio of design experience and capability.

Admission to the IPD program is available fall semester only.

FINANCIAL ASSISTANCE

The department offers research and teaching assistantships for graduate students. Graduate internships and tuition awards are also available for qualified students, but normally through a major professor. Select tuition scholarships are provided from industrial firms, as well.

Application for all awards may be obtained from the department and should be returned by March 15 for consideration for the following fall semester. Write to the Department of Mechanical Engineering.

RESOURCES AND OPPORTUNITIES

The College of Engineering and Technology, of which the Department of Mechanical Engineering is a part, has experienced rapid growth in funded research during the past decade. In recent years the college research budget has continued to grow steadily, with the budget for the 1995–96 fiscal year exceeding \$9 million.

Faculty research areas include: combustion; computer-aided design; controls; design methods; dynamic systems; fluid mechanics; heat transfer; internal combustion engines; machining; manufacturing systems; mechanisms; metallurgy; optimization; robotics.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500. (MeEn-CEEn) Design and Materials Applications. (3)

Prerequisite: CEEn 203; MeEn 372 or CEEn 321.

Applied and residual stress; materials selection; static, impact, and fatigue strength; fatigue damage; surface treatments; elastic deflection and stability—all as applied to mechanical design.

501. (MeEn-CEEn) Stress Analysis and Design of Mechanical Structures. (3)

Prerequisite: CEEn 321 or MeEn 372.

Stress analysis and deflection of structures; general bending and torsion with computer applications to mechanical and aerospace structure design.

502. (MeEn-CEEn) Composite and Smart Structures. (3)

Prerequisite: Math 213; CEEn 321 or MeEn 372; or equivalents.

Analysis of advanced composite structures; classical and energy approaches; design considerations; introduction to smart-structures concepts.

503. (MeEn-CEEn) Theory of Elasticity. (3)

Prerequisite: CEEn 203, Math 212.

Tensor notation, stress and deformation tensors, constitutive equations, field equations; plane-stress/ plane-strain, plate, axisymmetric, thermoelasticity, and large deformation problems.

506. (MeEn-CEEn) Continuum Mechanics and Finite Element Analysis. (3)

Prerequisite: Math 213; CEEn 321 or MeEn 372; or equivalents.

Equilibrium and constitutive equations; closed-form elasticity solutions; beam and plate theory; finite element methodology; membrane, axisymmetric, beam, plate, shell, and solid elements.

Application to heat transfer, flow-through porous media, and other problems.

507. (MeEn-CEEn) Finite Element Programming. (3)

Prerequisite: CEEn 321 or MeEn 372 or equivalent.

Developing a general-purpose computer program for analyzing trusses/frames. Developing a general finite element program.

508. (MeEn-CEEn) Dynamics and Stability of Structures. (3)

Prerequisite: Math 213; CEEn 321 or MeEn 372; or equivalents.

Dynamic analysis of single degree-of-freedom, discrete multi-degree-of-freedom, and continuous systems. Static and dynamic stability of structures.

510. Compressible Fluid Flow. (3)

Prerequisite: MeEn 312.

One-dimensional analysis of compressible flow with area change, friction, heat transfer, shock waves, and combined effects, including experimental methods.

512. Intermediate Fluid Dynamics. (3)

Prerequisite: MeEn 312 or instructor's consent.

Review of fluid properties, Navier-Stokes equations, exact and similarity solutions, introduction to potential flows, stream functions, lift and drag, boundary layers, vorticity, and turbulence.

515. Applied Aerodynamics and Flight Mechanics. (3)

Prerequisite: MeEn 312.

Modern applied aerodynamics, including performance, stability, and control of aerospace vehicles.

521. Intermediate Thermodynamics (3)

Prerequisite: MeEn 322 or instructor's consent.

Equations of state, thermodynamic relations, Maxwells equations, equilibrium of single and multiphase mixtures, chemical reactions, and product equilibrium.

522. Combustion. (3)

Prerequisite: Chem 105, MeEn 322, or instructor's consent.

Introduction to first and second law ideal gas combustion systems along with elementary models of homogeneous and heterogeneous premixed and/or diffusion flames.

523. (MeEn-CEEn) Design of Aircraft Structures. (3)

Prerequisite: CEEn 321 or MeEn 372 or equivalent.

Requirements, objectives, loads, materials, and tools for design of airframe structures; static behavior of thin-wall structures; durability and damage tolerance; certification and testing. Airframe component team design project.

531. Design of Control Systems. (3)

Prerequisite: MeEn 435.

Classical frequency response and time domain design of control systems. State variable control and computer simulation of control systems.

532. (MeEn-ECEn 511) Introduction to Linear Systems Theory. (3)

Prerequisite: ECEn 411 or MeEn 435 or instructor's consent.

Finite-dimensional linear systems. State variable realizations, canonical forms, controllability, observability, minimality. Time and frequency domain design of controllers and observers.

533. Digital Control Systems. (3)

Prerequisite: MeEn 531.

Design of digital controllers for mechanical systems, analysis using the z-transform, digital filter implementation, application of transform-based classical design methods, and modern state-space techniques.

534. Dynamics of Mechanical Systems. (3)

Prerequisite: MeEn 435 or equivalent.

Hamiltonian and Lagrangian dynamics, generalized coordinates, linear and angular momentum, Euler angles, rigid-body motions, and gyroscopic effects. Theory taught with applications integrated.

535. Mechanical Vibrations. (3)

Prerequisite: MeEn 435 or equivalent.

Introduction to energy methods for system modeling, eigenvalues and mode shapes, frequency response, and spectral characterization of vibrations.

536. Automation. (3)

Determining appropriate levels of manufacturing automation based on economics and productivity.

Elements of automation, including sensors, robots, conveyors, and part feeders.

537. Advanced Mechanisms, Robotics. (3)

Prerequisite: MeEn 337 or equivalent.

Kinematics and dynamics of advanced mechanisms, such as robots, with computer simulation of mechanism motion.

538. Compliant Mechanisms. (3)

Prerequisite: MeEn 337, 372; or instructor's consent.

Design and analysis of compliant mechanisms and compliant structures. Large-deflection analysis/force displacement relationships; mechanisms synthesis.

540. Intermediate Heat and Mass Transfer. (3)

Prerequisite: MeEn 440 or equivalent.

Analytical approaches to conduction, convection, and radiation heat transfer. Introduction to mass transfer.

541. Numerical Heat Transfer. (3)

Prerequisite: MeEn 440 or instructor's consent.

Heat transfer analysis by numerical methods. Finite difference and finite element methods, stability, and error analysis.

552. Intermediate Materials. (3)

Prerequisite: MeEn 250, 372; or equivalents.

Mechanical behavior of engineering materials including metals, plastics, ceramics, and composites.

553. Mechanical Behavior of Polymers. (3)

Prerequisite: CEEn 203, Mfg 355, or instructor's consent.

Generalized elasticity relations, viscoelasticity, yielding and fracture, crazing, rubber elasticity, anisotropic behavior, processing effects on optical and other properties.

556. Composite Material Design. (3)

Prerequisite: MeEn 250.

Macro- and micromechanical analysis and design of uni- and multidirectional composite materials.

557. Corrosion. (3)

Prerequisite: Chem 105 or equivalent.

Basic principles, eight common forms of corrosion, testing, materials, applications, modern theory, and high-temperature metal-gas reactions.

558. Metallurgy. (3)

Prerequisite: MeEn 250 or instructor's consent.

Fundamental principles of physical metallurgy and their application to design.

564. Digital Instrumentation and Mechatronic Systems. (3)

Prerequisite: MeEn 363 or equivalent.

Design and analysis of instrumentation systems, fundamental sensor characteristics, and computer data acquisition; time and frequency domain modeling with analog and digital components.

570. (MeEn-CEEn) Computer-Aided Engineering Software Development. (3)

Prerequisite: MeEn 273 or C programming.

Programming methods for the development of engineering software. Data structures, architecture, libraries, and graphical user interfaces, with applications to CAD systems.

572. (MeEn-CEEn-CS 557) Computer-Aided Geometric Design. (3)

Prerequisite: C or similar computer language background.

Mathematical theory of free-form curves and surfaces and solid geometric modeling. Bezier and B-spline curve and surface theory, parametric and implicit forms, intersection algorithms, topics in computer algebra, free-form deformation. Several programming projects required.

575. (MeEn-CEEn) Optimization Techniques in Engineering. (3)

Prerequisite: Math 213 and FORTRAN, C or similar computer language background.

Application of computer optimization techniques to constrained engineering design. Theory and use of state-of-the-art computer routines. Robust design methods.

576. Product Design. (3)

Prerequisite: MeEn 475 or instructor's consent.

Emerging design methodology and design strategies for complex systems, including decomposition methods and sensitivity analysis. Advanced CAD/CAE/CAM technologies applied to design.

577. Design for Manufacture and Assembly. (3)

Prerequisite: MeEn 372, Mfg 232; or equivalents.

Design practice for manufacturing considerations. Surface finish, tolerances, GD&T, and inspection and gaging principles. Application of computer-aided tolerancing and inspection.

578. CAD/CAM Applications. (3)

Prerequisite: advanced FORTRAN, C, or C++.

Principles and practices involved in parametric surface and solid modeling, associativity, NC tool path generation, etc. Construction of complete CAD models for design, analysis, and manufacture.

579. Advanced Process Mechanics. (3)

Prerequisite: MeEn 250, 440; or instructor's consent.

Analysis and experimental validation of selected manufacturing processes.

581. Internal Combustion Engines. (3)

Prerequisite: MeEn 322 or equivalent.

Fundamental operating characteristics of internal combustion engines, spark and compression ignition. Thermodynamic cycle analysis, performance and emissions characterization, and dynamometer testing on CFR and production engines.

584. Gas Turbine and Jet Engine Design. (3)

Prerequisite: MeEn 312, 322; or equivalents.

Design and synthesis of land-based and aircraft gas turbines utilizing fluid flow and thermodynamic fundamentals. Extensive discussion of turbojets, turbofan, and turboprop engines.

595R. Special Topics in Mechanical Engineering. (Arr.)

Prerequisite: departmental consent.

609. (MeEn-CEEn) Spectral Analysis of Dynamic Systems. (3)

Prerequisite: Math 213 or equivalent.

Digital signal processing and analysis applied to computer-aided testing, system identification, and characterization of random processes. Applications include vibration and acoustic testing, seismic recording and analysis, and system identification for control.

611. Turbulence. (3)

Prerequisite: MeEn 512.

Introduction to turbulence, flow instability and transition, concept of scale, Reynolds averaging, wall-bounded and free shear flows, closure modes, and measurement techniques.

612. Advanced Fluid Dynamics. (3)

Prerequisite: MeEn 512.

Advanced numerical and analytical solution methods for problems in fluid dynamics.

642. Radiative Heat Transfer. (3)

Prerequisite: MeEn 540.

Advanced engineering analysis of radiant heat exchange between surfaces, in enclosures, and in absorbing, emitting, and scattering media.

643. Convective Heat Transfer. (3)

Prerequisite: MeEn 540.

Advanced engineering analysis of convective heat transfer in internal and external laminar and turbulent flows.

671. Advanced Strategies for Product Development. (3)

Prerequisite: MeEn 475 or instructor's consent.

Theory of advanced strategies for product development. New concepts developed, tested, and applied to real products.

672. Advanced Product Development Lab. (1-3)

Prerequisite: MeEn 475 or equivalent.

Laboratory experience to support advanced independent product development projects.

673. Advanced Design Tool Development. (3)

Prerequisite: MeEn 570 and instructor's consent.

Development and implementation of advanced tools and methods for mechanical design.

674. Production System Design. (3)

Prerequisite: MeEn 671 or instructor's consent.

Designing manufacturing systems for competitive advantage. Factory layout, simulation and design, and tooling design. Integration of manufacturing design into product development process.

675. Advanced Manufacturing Strategies for Product Development. (3)

Prerequisite: Mfg 232 or equivalent.

Theoretical and experimental study of manufacturing methods such as machining, forming, casting, welding, etc.

681. Advanced Internal Combustion Engines. (3)

Prerequisite: MeEn 581.

Detailed combustion analysis of compression and spark ignition engines. Modeling concepts from zero to multidimensional. Engine heat transfer and I.C. engine diagnostics.

695R. Special Problems for Master's Students. (1-3)

Prerequisite: department chair's consent.

697R. Research. (6-9)

699R. Master's Thesis. (1-9)

791R. Seminar for Doctoral Students. (1)

795R. Selected Topics in Mechanical Engineering. (1-3)

799R. Doctoral Dissertation. (1-18)

FACULTY

BOWMAN, W. JERRY, *Associate Professor*. PhD, Air Force Institute of Technology, 1987. Heat Transfer.

CHASE, KENNETH W., *Professor*. PhD, University of California, Berkeley, 1972. Computer-Aided Design for Manufacturing.

COX, JORDAN, *Associate Professor*. PhD, Purdue University, 1991. Computer-Aided Engineering.

DAINES, RUSSELL L., *Assistant Professor*. PhD, Pennsylvania State University, 1995. Computational Fluid Dynamics.

EASTMAN, PAUL F., *Associate Professor*. PhD, University of Utah, 1965. Ceramics; Polymer and Composite Materials; Aerodynamics.

EVANS, MARK S., *Associate Professor*. PhD, Rensselaer Polytechnic Institute, 1987. Dynamics; Robotics.

FREE, JOSEPH C., *Professor*. PhD, Massachusetts Institute of Technology, 1967. Dynamic Systems; Modeling; Automatic Controls; Design Methods for Complex Systems.

GERMANE, GEOFFREY J., *Professor.*

PhD, Brigham Young University,
1978. Combustion System Design;
Internal Combustion Engines;
Automotive Engineering;
Thermodynamics.

HOWELL, LARRY L., *Assistant Professor.*

PhD, Purdue University, 1993.
Compliant and Rigid Body
Mechanisms; Solid Mechanics.

JENSEN, C. GREGORY, *Associate*

Professor. PhD, Purdue University,
1993. Computer Graphics
Software; Database Development;
Machining.

MAGLEBY, SPENCER P., *Associate*

Professor. PhD, University of
Wisconsin, Madison, 1988.
Computer-Aided Design,
Manufacturing; Intelligent Design
Systems.

MAYNES, R. DANIEL, *Assistant*

Professor. PhD, University of Utah,
1997. Fluid Mechanics.

McLAIN, TIMOTHY W., *Assistant*

Professor. PhD, Stanford
University, 1995. Dynamic
Systems; Controls; Robotics.

McQUAY, MARDSON Q., *Professor.*

PhD, Carnegie-Mellon University,
1987. Combustion.

MORTENSEN, KAY S., *Professor.* PhD,

University of Utah, 1967.
Materials; Expert Systems; Design
Methods.

PARKINSON, ALAN R., *Professor.* PhD,

University of Illinois, 1982.
Optimization; Computer-Aided
Engineering; Robust Design
Methods.

RAISOR, E. MAX, *Professor.* MS,

Brigham Young University, 1975.
Interactive Computer Graphics.

RED, W. EDWARD, *Professor.* PhD,

Arizona State University, 1972.
Robotics; Automation; Applied
Mechanics.

ROTZ, CHRISTOPHER A., *Associate*

Professor. PhD, Massachusetts
Institute of Technology, 1978.
Polymer Properties; Processing
Composites.

SIMMONS, VAL E., *Associate Professor.*

PhD, Utah State University, 1970.
Mechanisms; Machine Design.

SMITH, CRAIG C., *Professor.* PhD,

Massachusetts Institute of
Technology, 1973. Dynamic
Systems and Controls;
Automation; Auto Safety.

SORENSEN, CARL D., *Associate*

Professor. PhD, Massachusetts
Institute of Technology, 1985.
Design for Manufacture;
Manufacturing Processes.

TODD, ROBERT H., *Professor.* PhD,

Stanford University, 1971.
Manufacturing Processes; Process
Machine Development;
Manufacturing Systems;
Engineering Design.

TREE, DALE, *Assistant Professor.* PhD,

University of Wisconsin, 1992.
Combustion; Internal Combustion
Engines.

WEBB, BRENT W., *Professor.* PhD,

Purdue University, 1986. Heat
Transfer.

MICROBIOLOGY

Chair: Shauna C. Anderson

Graduate Coordinator: Kim L.
O'Neill

751 WIDB

Provo, UT 84602-5253

(801) 378-2449

THE PROGRAM OF STUDIES

Graduate studies in microbiology emphasize a combination of both course work and research experience. The department faculty provide current theory and informational material in a broad collection of courses and mentor graduate students in purposeful research efforts that lead to publication of research work in leading science journals. Completion of degree programs in the department qualify our graduates for further graduate study at other universities; employment in educational, industrial, medical and research institutions; or postdoctoral research opportunities leading to careers as productive research or academic scientists.

The Department of Microbiology offers two degrees: Microbiology—MS and Microbiology—PhD. The department also offers the following interdepartmental degrees: Molecular Biology—MS and Molecular Biology—PhD

Areas of specialization include: General Microbiology, Clinical Microbiology, Virology, Immunology, Cell Biology, Molecular Biology of Prokaryotes, Molecular Biology of Eukaryotes, Industrial Microbiology, Microbial Ecology, Molecular Genetics, Parasitology, Bioremediation, Microbial Physiology, Cancer Biology.

Typically, there are from twenty to thirty graduate students in the department at any one time. Approximately one-third of them are PhD students and the remainder are MS students. Average times in the programs are about two years for an MS degree, about three years beyond

the master's for the PhD degree, and about five years for the PhD, going directly from the bachelor's without the master's degree.

Admission and Entry.

All graduate programs in microbiology have the same admission and entry requirements:

- Semesters of entry and application deadlines: fall (preferred), February 1 (U.S. and international); winter, June 30 (U.S. and international).
- Entrance examination: GRE general test.
- Statement of intent must explicitly state field of interest and career goals.

Microbiology—MS

Admission and Entry.

- Complete preceding general requirements.
- Prerequisite: baccalaureate degree in microbiology or equivalent discipline; one year of inorganic chemistry (including laboratory); one semester of quantitative analysis; one year of organic chemistry; one semester biochemistry; one year of general physics at Phscs 105 level or higher; one semester of calculus (Math 119 or equivalent); Mcbio 351, 402, 403, 404, or equivalent.

Requirements for Degree.

- Credit hours (30 hours): minimum 24 course work hours plus 6 thesis hours (Mcbio 699R).
- Required courses: Mcbio 691R (attendance required each semester of residence), Zool 503; Stat 510 or 222; Stat 511, 512.
- Minor (optional): any approved minor in biological or physical science.
- Approved teaching experience.
- Thesis: standard university thesis or journal publication format.
- Examination: (A) oral examination on course work and (B) oral examination on thesis.

Microbiology—PhD

Admission and Entry.

Complete preceding general requirements plus one semester physical chemistry.

Requirements for Degree.

- Credit hours: candidates without a master's degree: 54 semester hours beyond baccalaureate, including no more than 18 hours of dissertation credit. Minimum 36 hours beyond master's degree, including 18 hours of dissertation (Mcbio 799R).
- Required courses: Mcbio 561, 691R (attendance required each semester of residence); Zool 503; Stat 510 or 222; Stat 511, 512.
- Minor (optional): any approved minor in biological or physical science.
- Approved teaching experience.
- Written qualifying examination before the end of the first year of residency and before selection of dissertation topic.
- Skill requirement: experience in statistics required and other courses as required by the graduate committee
- Dissertation: standard university dissertation or journal publication format.
- Examinations: (A) written and oral comprehensive examination on completion of skill requirement and all course work and (B) oral defense of dissertation.
- Two semesters of registration are required following successful completion of the comprehensive examination.

Molecular Biology Program—MS or PhD

Graduate degrees in molecular biology at Brigham Young University are coordinated by the Molecular Biology Program in the College of Biology and Agriculture. This degree prepares students in the philosophy, procedures, and tools used to perform biological research at the molecular level. Many specializations are available from molecular biology faculty in the Department of Microbiology. Thesis or dissertation

research requires a molecular approach to addressing an important issue in microbiology. Research projects focus on general microbiology, clinical microbiology, virology, immunology, cell biology, molecular biology of prokaryotes, molecular biology of eukaryotes, industrial microbiology, microbial ecology, genetics, parasitology, medical microbiology, bioremediation, microbial physiology, evolution, and cancer biology. Thesis research requires a molecular approach to addressing an important issue in microbiology. See individual faculty for a list of research interests.

Admission and Entry.

Students should apply to the Molecular Biology Program in the college and designate their preferred area of specialization as Microbiology. See Admission and Entry in the Molecular Biology section of this catalog.

Requirements for Degree.

See Requirements for Degree in the Molecular Biology section of this catalog.

FINANCIAL ASSISTANCE

The department offers, to qualified students, financial assistance in the form of teaching or research assistantships, fellowships, scholarships, or tuition waivers.

RESOURCES AND OPPORTUNITIES

Electron Optics Laboratory. In the Electron Optics Laboratory researchers can accomplish all standard electron optics procedures. The laboratory has transmission and scanning electron microscopes equipped with X-ray microanalysis capabilities, plus accessory equipment for freeze-fracture, freeze-drying, and necessary support facilities, including confocal laser scan microscopy.

Miscellaneous Campus Facilities. On the Provo campus are greenhouses, gardens, an arboretum, a small animal vivarium, and a tissue

culture room. Laboratory facilities include gas chromatography-mass spectrometers, isotope ratio mass spectrometers, transmission and scanning electron microscopes, ultracentrifuges, visible ultraviolet and infrared spectrophotometers, gas chromatographs, high-performance liquid chromatographs, infrared gas analyzers, atomic absorption spectroscopy, polymerase chain reaction thermocyclers, flow cytometers, and many other items.

Faculty research interests currently include: clinical microbiology; clinical laboratory science; immunology; molecular biology and genetics; oncology; parasitology; physiology; virology.

For a more detailed description of the graduate program requirements, send for a copy of the department's graduate student handbook.

COURSE DESCRIPTIONS

502. Immunobiology. (4)

Prerequisite: Mcbio 402 or equivalent.

Advanced immunology.

504. Molecular Biology of Animal Viruses. (4)

Prerequisite: Mcbio 404 or equivalent.

Molecular aspects of viral replication and infection.

521. Industrial Microbiology. (3)

Prerequisite: Mcbio 351, Chem 481; or equivalents.

551. Microbial Physiology. (3)

Prerequisite: Mcbio 451, Chem 481.

561. Radioisotope Methods. (2)

Prerequisite: college physics.

601. Molecular Approaches to Microbial Pathogenesis. (2)

Prerequisite: Mcbio 403.

Mechanisms of pathogenesis in host-parasite relationships.

611. Cellular Immunology and Immunogenetics. (2)

Current topics in immunology.

631. Molecular Mechanisms in Virology. (2)

Prerequisite: Mcbio 504; Chem 581 or equivalent.

Selected topics in molecular functions of animal viruses.

632. Cell and Tissue Culture Techniques. (2)

Prerequisite: Mcbio 504; Chem 581 or equivalent.

Advanced procedures in cell culture.

642. Molecular Biology of the Cell. (3)

Prerequisite: Mcbio 441.

Structure and function of the prokaryotic and eukaryotic cells at the molecular level. Emphasis on molecular aspects of membranes, cytoskeletons, organelles, cell-to-cell communication, and cell movement.

651R. Special Topics in Microbiology. (2-5)

691R. Graduate Seminar. (1)

695R. Research. (Arr.)

699R. Master's Thesis. (1-9)

799R. Doctoral Dissertation. (1-9)

FACULTY

ANDERSON, SHAUNA C., *Professor.*

PhD, University of Washington, 1984. Medical Technology; Clinical Chemistry.

BURTON, GREGORY F., *Associate*

Professor. PhD, Medical College of Virginia, 1989. Immunology.

HARKER, ALAN R., *Associate Professor.*

PhD, University of Utah, 1982. Microbial Physiology.

JENSEN, JAMES B., *Professor.* PhD,

Auburn University, 1976.

Immunology; Parasitology.

JOHNSON, F. BRENT, *Professor.* PhD,

Brigham Young University, 1970. Virology.

LEAVITT, RONALD W., *Professor.* PhD,

University of California, San Diego, 1975. Molecular Biology.

MCCLEARY, WILLIAM R., *Assistant*

Professor. PhD, University of California, Berkeley, 1990. Molecular Biology.

MURRAY, BYRON K., *Professor.* PhD, Brigham Young University, 1971. Virology.

NORTH, JAMES A., *Professor.* PhD,

University of Utah, 1964.

Virology.

O'NEILL, KIM L., *Associate Professor.*

DPHil, New University of Ulster, Northern Ireland, 1986. Genetics; Oncology.

ROBISON, RICHARD A., *Associate*

Professor. PhD, Brigham Young University, 1988. Molecular Biology; Immunology.

WOODWARD, SCOTT R., *Professor.*

PhD, Utah State University, 1983. Molecular Biology.

WRIGHT, DONALD N., *Professor.* PhD,

Iowa State University of Science and Technology, 1964. Clinical Microbiology.

MOLECULAR BIOLOGY

Program Coordinator: Scott R. Woodward

788 WIDB
Provo, UT 84602-5180
(801) 378-6259

THE PROGRAM OF STUDIES

Graduate study in molecular biology offers a comprehensive and interdisciplinary degree program. The program is supported by both the College of Biology and Agriculture and the College of Physical and Mathematical Sciences. Faculty in molecular biology represent specialties in Agronomy and Horticulture, Animal Science, Biochemistry, Botany and Range Science, Food Science and Nutrition, Microbiology, and Zoology. Graduate degrees can be taken under the direction of a molecular biology faculty member emphasizing any of the above specializations. Specific degree requirements are determined by the student's advisory committee and approved by the molecular biology program committee. Refer to the individual department sections of this catalog for course listings and thesis and dissertation projects that emphasize a molecular approach to departmental specializations.

Admission Requirements—MS and PhD Programs.

- Students wishing to obtain a graduate degree in molecular biology must make application to the Molecular Biology Program.
- Semesters of entry and application deadlines: February 1 for fall semester to receive full consideration for first-round acceptance and financial assistance.
- Entrance examination: GRE general test. Scores must be submitted with application to be considered for regular admission.
- **Note:** Statement of intent must explicitly state field of interest, specialization, and career goals.

Molecular Biology—MS

Admission and Entry.

- See preceding admission requirements.
- Prerequisite: baccalaureate degree in molecular biology or biological or physical science. One year of general university physics, mathematics equivalent to Math 113, one year of organic chemistry with laboratory, and one year of cell biology and genetics equivalent to Botny-Zool 341 and 342, or Mcbio 230 and 430.

Requirements for Degree.

- Credit hours (minimum 30): 24 course work hours plus 6 thesis hours.
- Minimum requirements include Chem 481, 582; Chem 586 or Mcbio 442; Stat 510 or 511; Mcbio 425, 441; Mcbio 642 or Zool 526.
- Specialty hours to be determined by program committee.

Molecular Biology—PhD

Admission and Entry.

- See above application requirements.
- Prerequisite: baccalaureate degree in molecular biology or biological or physical science. One year of general university physics, mathematics equivalent to Math 113, one year of organic chemistry with laboratory, and one year of cell biology and genetics equivalent to Botny-Mcbio-Zool 341 and 342, or Mcbio 230 and 430.

Requirements for Degree.

- Credit hours: candidates without a master's degree: 54 semester hours beyond baccalaureate degree, including no more than 18 hours of dissertation credit. Minimum 36 hours beyond master's degree, including 18 hours of dissertation.
- Same minimum course requirements as for molecular biology MS.

FINANCIAL ASSISTANCE

Students seeking financial assistance should consult with the sponsoring department.

RESOURCES AND OPPORTUNITIES

This interdisciplinary program has access to the resources of the sponsoring departments. For a complete list of the resources available, please refer to these individual listings in this catalog.

Faculty and graduate students are currently engaged in a number of significant and interesting research projects, funded both externally and internally.

For a more detailed description of the graduate program requirements, send for a copy of the sponsoring department's bulletin.

COURSE DESCRIPTIONS

For a complete course listing, please refer to the sponsoring department.

FACULTY

- BELL, JOHN D.,** *Assistant Professor.* PhD, University of California, San Diego, 1987. Pharmacology; Membrane Physiology.
- BENNETT, RANDY L.,** *Assistant Professor.* PhD, University of Wisconsin, Madison, 1993. Oncology; Molecular Developmental Biology; Genetics.
- BRADSHAW, WILLIAM S.,** *Professor.* PhD, University of Illinois, 1968. Developmental Biology.
- BUSATH, DAVID D.,** *Professor.* MD, University of Utah, 1978. Electrophysiology; Molecular Modeling; Molecular Biophysics.
- CHRISTENSEN, MERRILL J.,** *Associate Professor.* PhD, Massachusetts Institute of Technology, 1982. Selenium Metabolism; Molecular Biology.
- COLEMAN, CRAIG E.,** *Assistant Professor.* PhD, Pennsylvania State University, 1992. Plant Breeding; Molecular Genetics.
- CRANDALL, KEITH A.,** *Assistant Professor.* PhD, Washington University, 1993. Population; Evolutionary Biology.

ELTON, TERRY S., *Associate Professor*. PhD, Washington State University, 1986. Biochemistry.

EVANS, R. PAUL, *Associate Professor*. PhD, Medical College of Virginia, 1983. Molecular Biology.

FAIRBANKS, DANIEL J., *Associate Professor*. PhD, University of Arizona, 1988. Genetics; Plant Breeding; Biotechnology.

HARKER, ALAN R., *Associate Professor*. PhD, University of Utah, 1982. Microbial Physiology.

JELLEN, ERIC N., *Assistant Professor*. PhD, University of Minnesota, 1992. Plant Breeding.

JUDD, ALLAN M., *Associate Professor*. PhD, West Virginia University, 1981. Physiology; Neuroendocrinology.

KASPAR, ROGER L., *Assistant Professor*. PhD, University of Washington, 1991. Biochemistry.

KOORYMAN, DAVID L., *Assistant Professor*. PhD, Ohio University, 1993. Molecular Biology.

LEAVITT, RONALD W., *Professor*. PhD, University of California, San Diego, 1975. Molecular Biology.

LEPHART, EDWIN D., *Assistant Professor*. PhD, University of Texas Southwestern Medical Center, 1989. Neuroendocrinology.

MCCLEARY, WILLIAM R., *Assistant Professor*. PhD, University of California, Berkeley, 1990. Molecular Biology.

MURRAY, BYRON K., *Professor*. PhD, Brigham Young University, 1971. Virology.

O'NEILL, KIM L., *Associate Professor*. DPhil, New University of Ulster, Northern Ireland, 1986. Genetics; Oncology.

ROBISON, RICHARD A., *Associate Professor*. PhD, Brigham Young University, 1988. Molecular Biology; Immunology.

ROWE, MARK J., *Professor*. PhD, Brigham Young University, 1972. Molecular Biology; Mitochondrial Gene Expression.

SIMMONS, DANIEL L., *Associate Professor*. PhD, University of Wisconsin, Madison, 1986. Biochemistry.

STEVENS, MIKEL R., *Assistant Professor*. PhD, University of Arkansas, 1993. Plant Breeding; Molecular Genetics.

THWAITS, RICHARD N., *Professor*. DVM, Colorado State University, 1981; PhD, University of Georgia, 1991. Anatomy; Veterinary Technology; Molecular Biology; Medicine and Surgery; Physiology.

WHITING, MICHAEL F., *Assistant Professor*. PhD, Cornell University, 1995. Entomology.

WILLARDSON, BARRY M., *Assistant Professor*. PhD, Purdue University, 1990. Biochemistry.

WOODWARD, SCOTT R., *Professor*. PhD, Utah State University, 1983. Molecular Biology.

SCHOOL OF MUSIC

Director: David M. Randall
Graduate Coordinator: Thomas L. Durham

E-579A HFAC
 Provo, UT 84602-6410
 (801) 378-3226

THE PROGRAM OF STUDIES

The graduate programs of the School of Music are designed to preserve and develop an art form that is essential to human progress and well-being and to provide advanced instruction in the art and craft of music.

The School of Music provides graduate education in composition, music education, musicology, and music performance, and it maintains accreditation for all of its degree programs through the National Association of Schools of Music.

Three degrees are offered through the School of Music: Music—MA, Music—MM, and Music—PhD. A music minor is also offered.

The School of Music has an average enrollment of eighty graduate students from various U.S. and international areas. The average time for a student to complete a master's degree in music is two years.

Admission and Entry.

- Application deadlines, regardless of date of entry, are February 1 for U.S. students and January 1 for international students. Music education applicants for the MM and MA must enter summer term only.
- Application requirements: each applicant must submit specific materials relating to the applicant's intended specialization, which are reviewed by faculty members in that specialization. See specific areas. International students whose principal language is not English must submit a sample research paper that demonstrates adequate ability to write in English. This paper should be

submitted to the School of Music at the time completed application forms are submitted to Graduate Admissions.

- After being admitted, all students take the Graduate Placement Exam given in E-353 HFAC from 8:00 to 10:00 a.m. the Friday immediately preceding the beginning of fall semester classes. Any deficiencies diagnosed by the exam must be removed during the first year of study. Students may arrange to take the exam earlier by contacting the graduate coordinator.

Music—MA

The master of arts degree is offered with specializations in music education and musicology. A student whose background exhibits deficiencies in academic areas of music may be required to complete additional prerequisite courses during the MA.

MA in Music Education. This program offers the student an opportunity to contribute to the body of music education theory by completing a thesis based on experimental research. A second option is a thesis study that is descriptive in nature. A thesis of either type is expected to address an issue of significance to the field of music education. The document will also be prepared in article form and submitted for publication to a scholarly journal or for presentation at an appropriate professional conference.

MA in Musicology. This program prepares students to be teachers and scholars who will promote musical understanding and appreciation for the arts. Students are expected to add to the body of historical and analytical publication that has increased understanding of the history, practice, sociology, and aesthetics of the cultural heritage of Western (and to a lesser degree non-Western) music. This effort should also increase awareness of cultural and historical diversity represented in concert programs and recordings.

Admission and Entry.

MA Music Education: submit or complete the following with application:

- Proposal for an experimental or descriptive research study in the degree emphasis.
- Personal or telephone interview with the graduate music education faculty.

MA Musicology: submit the following with application:

- Sample scholarly research paper.
- List of publications, if any.

Requirements for Specialization—Music Education.

- Prerequisite: baccalaureate degree in music or equivalent.
- Credit hours (32): minimum 26 course work hours plus 6 thesis hours (Music 699R).
- Required courses: Music 501, 699R; 4 hours from Music 671, 672, 673, 674, 675; Stat 510.
- Electives: 8–10 hours from graduate music courses and 7–9 hours from graduate courses outside the music field.
- Thesis.
- Examinations: (A) comprehensive written examination; (B) defense of thesis.

Requirements for Specialization—Musicology.

- Prerequisite: baccalaureate degree in music or equivalent.
- Credit hours (32): minimum 26 course work hours plus 6 thesis hours (Music 699R).
- Required courses: Music 500, 607A,B, 699R; any 12 hours from 601, 602, 603, 604, 605, 606.
- Electives: 8 hours.
- Minor (optional): consult with department.
- Thesis.
- Examinations: (A) department language proficiency examination, normally in French or German; (B) comprehensive written examination; (C) defense of thesis.

Music—MM

The master of music degree is offered with specializations in Composition, Conducting, Music Education, and Performance.

MM in Composition. The purpose of this specialization is to produce graduates who are prepared to make

a significant contribution to the art form, either as composers or as teachers and scholars in composition and theory, and to provide aesthetic enrichment to both the composer and listener.

MM in Conducting. Students develop advanced, personal conducting skills and techniques that are precise and suited to a variety of musical needs; attain confidence, poise, and clarity with the baton; learn effective rehearsal techniques; and become familiar with a variety of instrumental and choral scores representing the repertoire of various music periods and sacred and secular styles. They learn to convey through gesture music's power and gentleness and its directness and subtlety to both the performer and audience and to select and bring to the community the great masterpieces of instrumental and choral literature.

MM in Music Education. This program aims to produce music educators who will be effective teachers and music leaders as well as advocates for the arts in their communities. Possessing a new and enriched perspective of what public music should be, they will be advocates and champions of musical excellence and be more effective in providing stimulating and satisfying musical experiences for students, while serving as exemplars to others in the profession.

MM in Performance. The intent of the specialization is to prepare students with outstanding performance potential to be competitive in performance and teaching careers and to be advocates for the arts in their communities. They may help meet the needs for skilled performers of solo and small and large ensemble music, and they will be able to teach privately and help meet the considerable community demand for excellent private studio teachers.

Admission and Entry.

MM Composition: submit the following with application:

- Portfolio of four compositions in various media.

- Recording of two or more of these compositions.

MM Conducting: submit the following with application:

- Programs of concerts presented and lists of pieces rehearsed as a conductor.
- High-quality recording and, if possible, a videotape recording of a representative performance of a group trained and conducted by the applicant.
- (a) Choral Emphasis: a personal or recorded performance that demonstrates the applicant's ability to play four-part homophonic and polyphonic music at the keyboard. (b) Instrumental Emphasis: an audio or video recording showing proficiency on the applicant's major instrument.

MM Music Education: submit the following with application:

- Photocopy of a valid teaching certificate.
- Written proposal of a possible master's project or thesis topic of interest to the applicant.
- Recording containing a representative performance of the applicant on the major instrument and a performance of a group trained and conducted by the applicant.

MM Performance: submit the following with application:

- Recital programs and repertoire lists from undergraduate study.
- Personal performance audition at Brigham Young University (preferred) or a videotape or recording of the senior recital or equivalent performance (acceptable).

Requirements for Specialization—Composition.

- Prerequisite: baccalaureate degree in music composition or equivalent in previous training.
- Credit hours (32): minimum 26 course work hours plus 6 master's composition hours (Music 688R).
- Required courses: Music 500, 503, 606, 687R (6 hours) 688R (6 hours); 3 hours from 601, 602, 603, 604, 605; 6 hours from 581, 583, 591, 596, 683.
- Electives: 3 hours.

- Recital: strongly recommended.
- Project.
- Examination: (A) final oral examination; (B) defense of project.

Requirements for Specialization—Conducting.

- Prerequisite: baccalaureate degree in music;
- Credit hours: minimum 32 course work hours.
- Required courses: Music 500, 600R (conducting, 4 hours), ensemble (2 hours), 697A,B.
Band Emphasis: Music 510, 532, 595, 606, and electives in addition to electives listed below (8 hours).
Choral Emphasis: Music 506, 507, 533R (4 hours), 664, and electives in addition to electives listed below (6 hours)
Orchestra Emphasis: Music 508, 509, 532, 595, and electives in addition to the electives listed below (6 hours).
- Electives: 6 hours (3 hours for band emphasis) in nonperformance music graduate courses (as approved by graduate committee) from one or more of the following areas: music education, music history, or music theory.
- Examinations: (A) jury examination each semester of enrollment in 660R; (B) repertory examination; (C) final oral examination.
- Closure project: Music 697A, B.

Requirements for Specialization—Music Education.

- Prerequisite: public school music teacher certification; baccalaureate degree in music.
- Credit hours: minimum 32 course work hours including a professional improvement project (Music 698A,B).
- Required courses: Music 501, 595, 673, 674, 675; 6 hours from 532, 533R, 534R; 4 hours from 560R; 698A, B.
- Project.
- Examination: (A) comprehensive written examination; (B) final oral examination; (C) defense of project.

Requirements for Specialization—Performance.

- Prerequisite: baccalaureate degree in performance or equivalent; pro-

ficiency in German, French, and Italian diction for voice candidates.

- Credit hours: minimum 32 course work hours.
- Required courses: Music 500, 660R (6 hours), ensemble (2 hours).
Voice or Orchestral Instrument Emphasis: Music 505R, 665, 670R (2 hours), 694R in applied literature (2 hours), 697A, B (4 hours) or 649R (2 hours) and electives in addition to the electives listed below (4–6 hours).
Keyboard Instrument Emphasis: Music 505, 591, 665, 670R (2 hours), 694R in applied literature (2 hours), 649R (2 hours) or 697A,B (4 hours) and electives in addition to the electives listed below (2–4 hours). The ensemble requirement listed above includes 644R.
- Electives: 6 hours in nonperformance music graduate courses (as approved by graduate committee) from one or more of the following areas: music education, music history, or music theory.
- Examinations: (A) jury examination each semester of enrollment in 660R; (B) repertory examination; (C) final oral examination.
- Closure project: the Music 697A,B sequence is the recommended closure project for the degree. With approval from the graduate committee, a student may select the solo recital (649R) option.

Music—PhD

The doctor of philosophy degree is offered with a specialization in musicology. A student's prerequisite master's degree would ordinarily be in the field of musicology or music history. Students with exceptional promise in other fields of music may also be considered for entrance, however, and are encouraged to apply.

PhD in Musicology. This program trains students to be teachers and scholars who will promote musical understanding and appreciation for the arts. It is expected that they will add to the body of historical and analytical publication that has increased understanding of the history, practice, sociology, and aesthetics

of the cultural heritage of Western (and to a lesser degree non-Western) music. This should also increase awareness of cultural and historical diversity represented in concert programs and recordings.

Admission and Entry.

PhD Musicology: submit the following with application:

- Thesis or sample scholarly research paper.
- List of publications, if any.

Requirements for Specialization—Musicology.

- Prerequisite: baccalaureate degree in music; master's degree in musicology or equivalent.
- Credit hours (86 beyond baccalaureate, 56–58 beyond master's): minimum 68 course work hours beyond the baccalaureate degree or 38–40 hours beyond the master's degree (subject to approval by the graduate committee), plus 18 dissertation hours (Music 799R).
- Required courses: Music 500, 596, 601, 602, 603, 604, 605, 606, 608A,B, 699R (thesis, 6 hours), 700R (6 hours), 799R (dissertation, 18 hours).
- Cognate field requirement: 8 hours from a single cognate field outside the School of Music (e.g., linguistics, philosophy, German literature, etc.).
- Language requirement: pass departmental examinations in French and German (additional languages may be required by graduate committee if necessary for candidate's research).
- Dissertation.
- Examinations: (A) comprehensive examination; (B) oral defense of dissertation.

Music—Minor

The School of Music follows the general university requirements established for the graduate minor. The student must:

- Obtain the approval of the director of the School of Music.
- Select a graduate faculty member (approved by the director) to serve as a graduate committee member.

- Register for and complete 9 semester hours of approved graduate credit in the minor.
- Pass an oral or a written comprehensive examination in the minor (prepared by the minor committee member).

FINANCIAL ASSISTANCE

The School of Music offers four types of graduate awards: assistantships, internships, performance awards, and scholarships. Application for financial aid is made on forms available from the School of Music's graduate office.

RESOURCES AND OPPORTUNITIES

The Harris Fine Arts Center, which houses the School of Music, contains two concert halls and numerous practice rooms for music, dance, and theatre.

Graduate students have opportunities to perform individually and with groups in both the Madsen Recital Hall and the de Jong Concert Hall in the Harris Fine Arts Center.

For a more detailed description of the graduate program requirements, request a copy of the department's graduate handbook.

COURSE DESCRIPTIONS

500. Musical Research Techniques. (2)

Prerequisite: graduate standing.

501. Music Education Research Techniques. (2)

Prerequisite: graduate standing.

503. Aesthetics. (3)

Fundamental questions of aesthetic theory from classical antiquity to the present, emphasizing musical aesthetics.

505R. Applied Literature. (2)

Prerequisite: minimum of one enrollment in Music 402–407.

Continuation of Music 402–407.

506. Choral Literature 1. (2)

Prerequisite: instructor's consent.

Concentrated analytical study and application of choral literature through Beethoven.

507. Choral Literature 2. (2)

Prerequisite: instructor's consent.

Concentrated analytical study and application of choral literature from post-Beethoven to the present.

508. Orchestra Literature 1. (2)

Prerequisite: instructor's consent.

Concentrated analytical study and application of orchestral literature of the baroque and classical eras.

509. Orchestra Literature 2. (2)

Prerequisite: instructor's consent.

Concentrated analytical study and application of orchestral literature of the romantic era and the twentieth century.

510. Band Literature. (2)

Prerequisite: instructor's consent.

Concentrated study of band literature through analysis and conducting.

532. Score Preparation and Conducting: Instrumental. (2)

533R. Score Preparation and Conducting: Choral. (2)

534R. Score Preparation and Direction: Jazz. (2)

560R. Performance Instruction. (2)

Prerequisite: graduate music major status.

Performance instruction for students not specializing in performance and for performance students wishing to study secondary instruments. \$270 fee.

562R. Orchestral Repertoire. (1)

Prerequisite: concurrent registration in Music 460R or 660R or instructor's consent.

Performance instruction in standard orchestral repertoire.

570. Music for Elementary School Teachers. (2)

Prerequisite: Music 371, 471, or elementary music teaching experience.

Experiences in teaching various music activities in the elementary school.

571. Elementary Education Music Pedagogy. (2)

Prerequisite: Music 371 and equivalent of elementary education teaching minor in music.

Orff, Dalcroze, and Kodaly materials and techniques.

575R. Summer Music Workshops and Clinics. (1–4) On dem.**576. Fundamentals and Techniques of the Marching Band. (2)**

Prerequisite: Music 294, 296.

Planning, charting, and scoring for marching bands. For music education majors only.

581. Twentieth-Century Orchestration. (3)

Prerequisite: Music 481.

New techniques for standard and new instruments; analysis and listening.

583. Sixteenth-Century Counterpoint. (3)

Prerequisite: Music 483.

Strict modal counterpoint in sixteenth-century style (Palestrina); includes species, text setting, and motet.

591. Advanced Topics in Keyboard Harmony. (2)

Prerequisite: Music 407.

Topics vary.

595. Score Analysis. (2)

Analysis of representative choral and instrumental works from the Renaissance through contemporary styles.

596. Schenker Analysis. (3)

Prerequisite: Music 395 or equivalent.

Schenker's system of tonal analysis.

599R. Academic Internship. (1–6)

Prerequisite: instructor's consent.

Internship in creative, performing, producing, or teaching applications of major course work.

600R. Topics in Music. (1–3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

601. Music in the Middle Ages. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

602. Music in the Renaissance. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

603. Music in the Baroque Era. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

604. Music in the Classic Period. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

605. Music in the Romantic Period. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

606. Music of the Contemporary Period. (3)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

607A. Seminar in Musicology. (2)

Prerequisite: Music 301, 302, 303, 304, or equivalent.

607B. Seminar in Musicology. (2)

Prerequisite: Music 607A.

608A. History of Notation and Paleography 1. (3)

Prerequisite: Music 301, 302, 303, 304, 601, or equivalent.

Notation from the early Christian chant to approximately 1400.

608B. History of Notation and Paleography 2. (3)

Prerequisite: Music 608A.

Offered same year as Music 608A. Notation from approximately 1400 to 1625, including tablatures.

614R. Concert Choir. (1)**615R. University Singers. (1)****619R. Music Theatre Performance. (1–3)****626R. Wind Symphony. (1)****634R. Synthesis. (1)****637R. Sinfonia. (1)**

Prerequisite: audition.

638R. Philharmonic Orchestra. (1)**639R. Chamber Orchestra. (1)****641R. Brass Chamber Music. (1)****642R. Early Music Ensemble. (1)****643R. Guitar Ensemble. (1)****644R. Keyboard Ensemble. (1)****645R. Percussion Ensemble. (1)****646R. String Chamber Music. (1)****647R. Vocal Chamber Music. (1)****648R. Woodwind Chamber Music. (1)****649R. Solo Recital. (2)**

Prerequisite: concurrent registration in Music 660R.

660R. Performance Instruction: Major. (2)

Prerequisite: completion of undergraduate performance proficiency requirements and audition; primary instrument only. \$240 fee.

For performance specialization.

664. Choral Development. (2)

Prerequisite: instructor's consent.

Conducting and teaching skills as principles of choral artistry.

665. Pedagogy. (2)

Prerequisite: completion of appropriate undergraduate pedagogy courses or equivalent.

Advanced pedagogical studies.

670R. Supervised Teaching. (2)

Prerequisite: graduate music major status.

Supervised private and group instruction.

671. Influence of Music on Behavior. (2)

Variables that influence musical behavior and effects of music on nonmusical behavior.

672. Psychology of Music. (2)

Psychoacoustical properties of musical phenomena and the neurological aspects of music perception and performance.

673. Historical and Social Foundations of Music Education. (2)

Leaders, events, and trends in history of music education, emphasizing sociological implications.

674. Philosophical and Aesthetic Foundations of Music Education. (2)

Questions related to teaching music in the public schools.

675. Theories of Music Learning and Motivation. (2)

Applications of psychology to teaching and learning music. Research paper required.

683. Twentieth-Century Counterpoint. (3)

Prerequisite: Music 583.

Counterpoint from the works of Schoenberg, Stravinsky, Crumb, Lutoslawski, and others.

684. Advanced Fugue. (3)

Prerequisite: Music 483.

Fugues in Bach's *Well-Tempered Clavier* and other exemplary works.

687R. Composition. (3)

688R. Composition for Master's Degree. (1-6)

Prerequisite: graduate music faculty's consent, based on evidence of ability in composition manifested in preliminary work.

694R. Independent Readings. (1-3)

Prerequisite: graduate committee's consent.

697A. Scholarly Paper for Master of Music Degree. (2)

Preparation of formal paper related to music of graduate recital. Supervised by a member of music history and literature faculty as directed by the student's graduate advisor.

697B. Recital. (2)

Prerequisite: Music 697A and graduate committee's and graduate music faculty's consent.

698A. Master's Project—Professional Improvement Project. (2)

Identifying and delineating a project. Study list constructed and advisor assigned.

698B. Master's Project—Professional Improvement Project. (2)

Presentation of project and written report.

699R. Master's Thesis. (1-9)

Prerequisite: department graduate faculty's consent.

700R. Seminar in Music. (1-3)

Prerequisite: Music 500 or 501 (or equivalent) and graduate committee's consent.

799R. Doctoral Dissertation. (1-9)

Prerequisite: department graduate faculty's consent.

FACULTY

ANDERSON, RICHARD P., *Associate Professor*. DMA, University of Colorado, 1986. Piano Pedagogy.

BACHELDER, DANIEL F., *Professor*. PhD, Brigham Young University, 1976. Trombone and Brass Performance and Pedagogy.

BLACKINTON, DAVID P., *Professor*. DMA, Catholic University of America, 1975. Band Conducting; Trumpet and Brass Performance and Pedagogy.

BOOTHE, RANDALL W., *Associate Professor*. MM, Brigham Young University, 1979. Music Education.

BROUGH, RONALD P., *Assistant Professor*. DA, University of Northern Colorado, 1997. Percussion Performance and Pedagogy.

BROWN, DAVID C., *Associate Professor*. MM, University of Toledo, 1997. Trumpet Performance and Pedagogy.

BUSH, DOUGLAS E., *Professor*. PhD, University of Texas, 1982. Musicology; Organ.

COOK, R. DONALD, *Associate Professor*. DMA, University of Kansas, 1987. Organ Performance and Pedagogy.

DALTON, DAVID, *Professor*. DM, Indiana University, Bloomington, 1970. Primrose International Viola Archive; Viola and String Performance and Pedagogy.

DAYLEY, K. NEWELL, *Professor*. DA, University of Northern Colorado, 1986. Brass Performance and Pedagogy.

DURHAM, THOMAS L., *Professor*. PhD, University of Iowa, 1978. Theory and Composition.

GIOVANNETTI, GERALYN, *Associate Professor*. DMA, University of Michigan, 1990. Oboe and Woodwind Performance and Pedagogy.

GRUPPMAN, IGOR, *Professor*. Diploma, Moscow Conservatory, 1979. Violin Performance and Pedagogy.

HARKER, BRIAN C., *Assistant Professor*. PhD, Columbia University, 1997. Musicology.

HICKS, MICHAEL D., *Professor*. DMA, University of Illinois, 1984. Theory and Composition.

HOLMAN, WILLIAM M., *Associate Professor*. DMA, University of Iowa, 1977. Clarinet and Woodwind Performance and Pedagogy.

HOPKIN, J. ARDEN, *Professor*. DMA, University of Rochester, 1978. Voice Performance and Pedagogy.

JACCARD, JERRY L., *Assistant Professor*. EdD, University of Massachusetts, 1995. Music Education.

JESSOP, SCOTT G., *Associate Professor*. PhD, Brigham Young University, 1980. Music Education.

JOHNSON, STEVEN P., *Associate Professor*. PhD, University of California, Los Angeles, 1989. Musicology.

JONES, STEPHEN M., *Associate Professor*. DMA, University of Cincinnati, 1989. Theory and Composition.

KENNEY, SUSAN HOBSON, *Associate Professor*. MA, Brigham Young University, 1978. Elementary Music Education.

LINDEMAN, STEPHAN D., *Assistant Professor*. PhD, Rutgers University, 1995. Music Theory and History.

LOWE, LAURENCE M., *Associate Professor*. MM, University of Rochester, 1981. Horn and Brass Performance and Pedagogy.

MONSON, DALE E., *Professor*. PhD, Columbia University, 1982. Musicology.

PEERY, IRENE W., *Associate Professor*. DMA, Peabody Conservatory of Johns Hopkins University, 1987. Piano Performance and Pedagogy.

PETERSON, DONALD L., *Associate Professor*. DMA, Arizona State University, 1986. Music Education.

POLLEI, PAUL C., *Professor*. PhD, Florida State University, 1975. Piano Performance and Pedagogy.

POWLEY, E. HARRISON, *Professor*. PhD, University of Rochester, 1974. Musicology.

PRATT, ROSALIE REBOLLO, *Professor*. EdD, Columbia University, 1976. Music Education.

RANDALL, DAVID M., *Professor*. DMA, University of Iowa, 1970. Clarinet and Woodwind Performance and Pedagogy.

ROBISON, CLAYNE W., *Professor*. DMA, University of Washington, 1973. Vocal Performance and Pedagogy.

RUPPE, ELIZABETH A., *Assistant Professor*. DMA, University of North Texas, 1996. Flute Performance and Pedagogy.

RYTTING, BRYCE, *Assistant Professor*. PhD, Princeton University, 1996. General Music Studies.

SARGENT, DAVID H., *Professor*. DMA, University of Illinois, 1975. Theory and Composition.

SHUMWAY, JEFFREY L., *Associate Professor*. DM, Indiana University, 1982. Piano Performance and Pedagogy.

SMITH, CHRISTIAN B., *Assistant Professor*. MM, Brigham Young University, 1993. Bassoon Performance Instruction.

SMITH, RAYMOND, *Associate Professor*. DM, Indiana University, 1982. Saxophone and Woodwind Performance and Pedagogy.

STAHELI, RONALD J., *Professor*. DMA, University of Southern California, 1977. Choral Conducting.

STUART-BACHELDER, LILA R., *Professor*. DMA, Indiana University, 1993. Vocal Performance and Pedagogy.

VINCENT, LAWRENCE P., *Professor*. DMA, University of Michigan, 1981. Vocal Performance and Pedagogy.

COLLEGE OF NURSING

Dean: Sandra Rogers
Graduate Coordinator: Mary Williams

594 SWKT
 Provo, UT 84602-8606
 (801) 378-5626

THE PROGRAM OF STUDIES

The graduate program, administered by the College of Nursing, has four major goals: (1) to prepare expert clinicians in a nursing specialty; (2) to prepare leaders who implement changes in health care; (3) to prepare nurses who conduct research for solutions to clinical, educational, or administrative problems; and (4) to prepare nurses for doctoral study.

The College of Nursing is a member of the Council of Baccalaureate and Higher Degree Programs of the National League for Nursing, the American Association of Colleges of Nursing, and the Western Council on Higher Education in Nursing. The program is accredited by the Commission on Collegiate Nursing Education and the National League for Nursing and approved by Utah State Board of Nursing.

The College of Nursing offers one degree in nursing—the master of science—in which two specialty areas are available: Family Nurse Practitioner and Health-Care Systems Administration. The Health-Care Systems Administration program offers two emphases: (1) Care Management and (2) Administration. Contact the College of Nursing for details about these programs.

The National League for Nursing Accreditation Commission is a resource for further information. Contact at NLNAC, 350 Hudson Street, New York, NY, 10014, telephone (212) 989-9393.

Approximately sixty students are enrolled in the College of Nursing's graduate program. The programs

can be completed in approximately two to three years, although five years are allowed.

Nursing—MS

The master of science degree program emphasizes clinical expertise and includes nursing theories and concepts as well as extensive clinical experience. Research is an important component of the program, and students are required to write a thesis or develop an innovative clinical project.

Admission and Entry.

- Semesters of entry and application deadlines: spring term only, December 1 (U.S. and international).
- Recommendations: three letters of recommendation from former teachers or employers.
- Personal statement: brief (three pages or fewer) prepared statement of personal philosophy and goals for graduate education.
- GPA: minimum 3.0 GPA for last 60 hours.
- Interview.
- Written essay: topic will be provided prior to the scheduled interview. Essay is to be written on site.
- Graduate Record Examination general test.
- Resumé.
- Prerequisite: baccalaureate degree.
- License: current RN licensure in Utah.
- Completion of basic statistics course.
- Transportation: candidates may be required to travel to gain experience in a variety of hospitals and clinics and to visit agencies and client homes; therefore, access to a car is necessary.
- Student malpractice insurance: the university incurs the cost for this insurance.

Requirements for Degree.

- Credit hours:
Health-Care Systems Administration Specialization (44): minimum 38 course work hours plus 6 of either thesis or project hours (Nurs 698R or 699R).

Family Nurse Practitioner

Specialization: minimum 47 course work hours plus 6 thesis or project hours (Nurs 698R or 699R).

- Required courses:

Health-Care Systems Administration Specialization:

Care Management emphasis: Nurs 600, 601, 603, 604, 609, 610, 611, 612, 613, 615, 616, 617, 618, 650, 698R or 699R, and an elective.

Administration emphasis: Nurs 600, 601, 603, 604, 610, 611, 612, 613, 618, 650, 698R or 699R, PMgt 603, 643, 660, and an elective.

Family Nurse Practitioner

Specialization: Nurs 551, 555, 600, 601, 603, 604, 620, 622, 627, 630, 632, 635, 650; 698R or 699R.

- Electives: determined in consultation with graduate committee.
- Thesis: thesis or project.
- Examination: oral defense of thesis or project.

FINANCIAL ASSISTANCE

The College of Nursing actively seeks financial resources to assist students. State and governmental funds are available, and RNs can usually find local part-time work. The university also has limited funds available. Students who need financial aid should contact the College of Nursing graduate coordinator. University awards are in the form of internships and assistantships.

Assistantships. Students must be registered and able to meet the skill and credit-hour requirements for the available teaching and research assistantships. For more information, students should meet with the college graduate coordinator.

Scholarships. Scholarships, awarded on the basis of GPA and need, are available to degree-seeking master's students. Recipients must take at least 2 credit hours per semester to maintain the scholarship. They must also maintain at least a 3.0 GPA. See the college graduate coordinator or the graduate secretary for more information.

RESOURCES AND OPPORTUNITIES

Research Center. The college research center, available to faculty and graduate students, is equipped with computer stations and software supporting statistical quantitative data analyses and qualitative data management. The center has graphics capability and assists in the preparation of research reports, articles, and presentations.

Study Facilities. Clinical agencies in urban and rural Utah are settings for advanced practice residencies. Many of these institutions maintain continual clinical research programs and innovative management strategies appropriate for graduate students. Nurse practitioner clinics and rural practitioner sites also offer a challenging experience in becoming an independent practitioner. A graduate study room is available on the fifth floor of the Spencer W. Kimball Tower.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

510R. Special Programs and Projects. (1–4)

Prerequisite: instructor's consent.

551. Health Assessment. (3)

Development of physical assessment techniques.

555. Pharmacology in Advanced Practice. (3)

Principles of pharmacology and drug therapy for nurse practitioners.

580. Nursing Information Systems. (3)

Prerequisite: admission to nursing major.

Use of computer technology in nursing research, client care, and education.

590R. Independent Study. (1–4)

Prerequisite: instructor's consent.

Individualized study.

600. Nursing Science 1. (2)

Applying and synthesizing knowledge, theory, and research to provide quality health care, initiate change, and improve nursing practice.

601. Nursing Science 2. (2)

Prerequisite: Nurs 600.

Applying and synthesizing knowledge, theory, and research to provide quality health care, initiate change, and improve nursing practice.

603. Health Issues, Policy, and Ethics. (3)

Assessing the impact of social issues, trends, and ethics on nursing practice and developing strategies to effectively influence health policy.

604. Health-Care Planning. (3)

Assessment, planning, and accountability for access, cost, and quality outcomes for diverse populations within the community.

609. Management of People with High-Risk/High-Volume DRG's/ACG's. (3)

Epidemiologic/pathophysiologic concepts presented as the foundation for identifying and understanding appropriate management of high-risk/high-volume DRG/ACG populations by care managers.

610. Process and Performance Improvement. (2)

Measuring and evaluating patient care outcomes through process and performance improvement.

611. Strategic Planning, Marketing, and Decision Making. (3)

Acquiring strategies, tools, and techniques of planning, marketing, and decision making to effectively manage change in health-care organizations.

612. Leadership and Management. (3)

Developing effective leadership and management strategies through analyzing and evaluating leadership, management, and organizational concepts and theories.

613. Health-Care Finance (3)

Maintaining productivity and quality care through budget development and resource management.

615. Care Management 1. (3)

Care management theories, functions, processes, and evaluation techniques for individuals and populations.

616. Care Management 2. (3)

Prerequisite: Nurs 615.

Applying care management theories, functions, processes, and evaluation techniques to individuals and populations.

617. Principles of Health Promotion/Disease Prevention for Care Managers. (3)

Strategies for population-focused health promotion and disease prevention for individuals, families, and communities.

618. Clinical Practicum. (3)

Prerequisite: all program courses.

Clinical practicum in area of specialization.

620. Pathophysiology and Diagnostic Testing. (3)

Prerequisite: Nurs 551.

Physiologic basis for therapy in complex clinical problems; development of laboratory testing skills.

622. Management of Common Disorders (7)

Prerequisite: Nurs 551.

Health promotion and prevention of common psychosocial and physiological disorders; diagnosing and managing common alterations across the life span.

627. Management of Family Health (2)

Theoretical foundations and strategies to manage family health.

630. Management of Chronic Disorders. (6)

Prerequisite: Nurs 622.

Health promotion and prevention of chronic psychosocial and physiological disorders; diagnosing and managing chronic alterations across the life span.

632. Management of Acute Disorders. (5)

Prerequisite: Nurs 630.

Health promotion and prevention of acute psychosocial and physiological disorders; diagnosing and managing acute alterations across the life span.

635. Family Nurse Practitioner Internship. (6)

Prerequisite: Nurs 632.

Internship as a family nurse practitioner.

650. Synthesis Seminar. (2)

Prerequisite: Nurs 604.

Developing professional negotiating and teamwork skills.

698R. Project. (1-6)

Prerequisite: committee's consent.

Master's project.

699R. Master's Thesis. (1-6)

Prerequisite: committee's consent.

FACULTY

ANDERSON, VICKIE LANE, *Associate Professor*. MS, Brigham Young University, 1983. Nurse Practitioner.

BALDWIN, JOAN, *Associate Professor*. DNSc, Catholic University of America, 1992. Health Promotion in Nursing.

BECKSTRAND, RENE, *Assistant Professor*. MS, Brigham Young University, 1987. Comprehensive Care of the Adult Client With Acute Health Problems.

BERRY, JUDITH, *Assistant Clinical Professor*. MSN, Catholic University of America, 1984. Rural Primary Healthcare.

CALLISTER, LYNN, *Associate Professor*. PhD, University of Utah, 1993. Cultural Meanings of Childbirth; Women's Health.

CAMPBELL, LORA JEAN, *Assistant Professor*. MS, University of Utah, 1972. Pediatrics.

CONGER, CYNTHIA, *Assistant Professor*. PhD, University of Utah, 1994. Transcultural Nursing.

FOSBINDER, DONNA, *Professor*. DNSc, University of San Diego, 1990. Nursing Administration; Patient Perceptions of Nursing Care.

- LOOKINLAND, SANDRA**, *Professor*. PhD, University of California, Los Angeles, 1983. Physiology; Critical Care; Nursing Management.
- MANDLECO, BARBARA L.**, *Associate Professor*. PhD, Brigham Young University, 1991. Growth and Development; Resilience in Children.
- MARSHALL, ELAINE SORENSEN**, *Associate Professor*. PhD, University of Utah, 1987. Children and Stress; Family Adaptation; Descriptive Methods.
- MEASOM, GARY**, *Assistant Professor*. PhD, University of New Mexico, 1992. Effects of Short Term Exercise Training Programs.
- RIDDLE, LANA B.**, *Associate Professor*. PhD, Texas Woman's University, 1984. Capsular Contracture in Mammoplasty; Clinical Problems.
- ROGERS, SANDRA**, *Associate Professor*. DNSc, University of California, San Francisco, 1989. Primary Health Care; International Health.
- SCHWARTZ, ROSANNE**, *Associate Professor*. PhD, University of Florida, 1991. Oxygenation in Neonates.
- WARNICK, MYRNA**, *Associate Clinical Professor*. MSN, University of Utah, 1973. Nursing Management.
- WILLIAMS, MARY**, *Associate Professor*. PhD, University of Arizona, 1991. Transplant Anxiety; Management; Qualitative Methodology.

ORGANIZATIONAL LEADERSHIP AND STRATEGY

Program Director: W. Gibb Dyer, Jr.

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Provo, UT 84602-3023
(801) 378-2664
Fax: (801) 378-8098
E-mail: mob@byu.edu
Internet: <http://msm.byu.edu>

THE PROGRAM OF STUDIES

Organizational Behavior— MOB

Organizational behavior is a relatively new professional field dedicated to creating compatibility between organizational goals and human values. Emphasizing the applied behavioral sciences, this two-year professional program is designed to prepare competent and ethical specialists. The master's degree program in organizational behavior is small, highly selective, and designed to meet the needs of individuals in two categories: (1) those who wish to take a position in an organization working in the areas of human resource management, organization development, or strategy and (2) those who plan to pursue a doctoral degree in organizational behavior and then to enter university teaching, consulting, or equivalent positions in industry.

Each individual's program will be designed to meet that person's needs. Each student admitted will spend time doing organizational field research and have opportunities for teaching.

Since the program prepares individuals for professional careers, it is important that students be self-motivated, be able to accept individual responsibility, have a high tolerance for ambiguity, be able to design and implement action programs, and have a high degree of sensitivity to others.

One degree is offered through the Department of Organizational Leadership and Strategy: Master of Organizational Behavior—MOB. Joint MOB/JD and MOB/International Development degrees are also available contingent upon acceptance to both programs.

An average of twenty-five students are admitted to each year's class. This restriction encourages faculty/student interaction. Individuality and creativity are stressed, although emphasis is given to team learning experiences. The degree takes four semesters to complete.

The program is designed to equip individuals with theoretical, analytical, diagnostic, and "change-agent" skills. These skills help graduates gather appropriate organizational information and make appropriate interventions. Human resource management skills involving employee selection, training, compensation and benefits, and personnel law are also a central part of the curriculum.

A strong emphasis is given to applied behavioral science areas such as decision making, leadership, motivation, organization design, management of conflict, organization-environment interface, planned change, and research. Course work is structured to give practical experience through special projects and research.

Admission and Entry.

- Semesters of entry and application deadlines: fall, January 15, priority deadline (U.S. and international) and March 1, final deadline (U.S.).
- Application requirements: minimum 3.0 GPA on a 4.0 scale for last 60 hours.
- Entrance examination: GMAT or GRE general test
- Prerequisite: baccalaureate degree; interpersonal competence; interests and values consistent with a career in organizational behavior.

Requirements for Degree.

- Students in this program who do not have an undergraduate business major or minor will be

required to take business fundamentals. All MOB students will also take the following required organizational behavior courses: OrgB 601, 602, 603, 604, 605, 606, 607, 608, 680. By doing this, all students will fulfill AACSB requirements for a well-rounded business education, as well as develop in-depth expertise in organizational behavior.

The preceding does not represent the full range of requirements and opportunities in the program. Contact the department for greater details.

FINANCIAL ASSISTANCE

The Department of Organizational Leadership and Strategy utilizes the Marriott School's financial aid provisions. Qualified students can receive aid from the following: the Marriott School Scholarship Fund, private scholarship donations, assistantship awards, and loan assistance.

Scholarships. The Marriott School currently has over sixty-five private scholarships. Information and applications are available for second-year students in 730 TNRB (deadline: March 31). In addition, the MOB program has scholarship funds, including two private scholarships:

- The Stephen G. and Louise R. Covey MOB Scholarship.
- The Culbert Laney Memorial Scholarship in Organizational Behavior.

Assistantships. Research and teaching assistantships are available for qualified students.

Loans. Several loans are available for Marriott School students:

- Marriott School loans: available to full-time Marriott School day students. Marriott School loans are handled on an individual basis, dependent on financial need and standing within the participating program.
- BYU short-term loans: available for up to the cost of tuition only.

- Federal Stafford loans: subsidized by the U.S. government. Not available for international students.

More information on and applications for these loans are available from the BYU Financial Aid Office, A-41 ASB, (801) 378-4104.

RESOURCES AND OPPORTUNITIES

The N. Eldon Tanner Building. The Tanner Building, which houses the Marriott School, is one of the finest facilities of its kind. Surrounding the dramatic eight-story atrium at its center are lecture and seminar rooms, study rooms, a computer laboratory, and a working library.

Much of the program's success results from the national prominence of the faculty. Each member represents expertise in distinct areas of organizational behavior and development. Faculty research interests currently include: human resource management; ethics; entrepreneurship; international management; diversity; labor relations; strategies in declining organizations; consulting; leadership; organizational culture; and industrial democracy.

COURSE DESCRIPTIONS

Organizational Behavior

531. Managing Entrepreneurial Firms and Family Businesses. (3)

Issues and problems faced by managers of entrepreneurial enterprises and leaders of family-owned businesses.

541. Training and Development. (3)

Analyzing learning theories, training methods and strategies, training and development applications, and production and use of current technology for training and human resource development.

551. Theory and Practice of Third-World Development. (3)

Paradigms of economic development; strategies and applications in various societies.

561. Labor Relations. (3)

Overview of the U.S. system of industrial relations and collective bargaining; evolution of unionism and labor-management relations, labor law, union-organizing campaigns, contract negotiation, and arbitration procedures.

601. Organizational Paradigms. (3)

Introduction to historical development and application of alternative organizational paradigms. Implications of these paradigms for understanding and influencing organizational behavior.

602. Organization Theory. (3)

Theoretical foundations for organizational diagnosis, particularly emphasizing building diagnostic models and frameworks.

603. Research Design and Data Analysis. (3)

Philosophy of science as it relates to research methodology; both qualitative and quantitative methods of data gathering and analysis.

604. Dynamics of Organizational Change: Interventions and Strategies. (3)

Forces operating to induce or resist change in organizations; current models and methods for organizational intervention and the intervention process.

605. Human Resource Management. (3)

Analysis of human resource functions, including HR planning, staffing, interviewing, selection, performance evaluation, training and development, compensation and benefits, labor relations, and labor laws.

606. Dynamics of Groups and Work Teams. (3)

Group dynamics and process in organizations. Theory and skill development applied to both individual roles in groups and effective work teams.

607. Strategic Management: Issues and Perspectives. (3)

Several approaches to strategic thinking to gain appreciation for strengths and weaknesses; insights applied to current strategic issues.

608. Qualitative Research Methods. (1)

Research design, organizational diagnosis, and qualitative methods, such as interviewing, archival data analysis, and observation.

610. Leadership and Management. (3)

Review of leadership and management frameworks; developing and improving personal competency in leading and managing.

614. Organizational Communication. (3)

Theory and research of organizational communication as the basis for understanding human resource development.

616. Industrial Democracy. (3)

Contemporary efforts to restructure the workplace, including co-determination, self-management, cooperatives, and other quality-of-work-life schemes, especially in the U.S. and Europe.

630. Dynamics of Interpersonal Behavior. (3)

Application of skills in problem diagnosis, empathy, and communications in group and interpersonal settings.

636. Diversity and Discrimination in Organizations. (3)

Dynamics of difference and discrimination in organizations, considered from three perspectives: interpersonal, intergroup, and institutional. This course provides a model that has helped managers analyze discrimination and work more effectively with different employee populations.

645. Managing Organization Cultures. (3)

Insights and skills used to diagnose relationships between organizational mission and organizational culture. Examination of patterned customs and meanings of a particular group, such as taken-for-granted assumptions, values, and conceptual frameworks. Primarily oriented toward getting students into organizations where they can apply and improve their skills and insights.

660R (OrgB-MBA 647). Advanced Seminar in Organizational Behavior. (1-3)

Special topics or problems varying from semester to semester, e.g., conflict resolution, power and influence, intergroup relations, career development and planning, and management skills.

669R. Readings in Organizational Behavior. (1-6)

Reading and discussion course with direction from a faculty member in areas of the student's interest.

672. The Consultative Process. (3)

Examination of role in group development, educational processes, conflict resolution, and organizational interventions and strategies. Evaluations of the ethical and skill requirements of the consultative role.

679R. Practicum in Organizational Development. (1-6)

Completion and analysis of an organizational development project under supervision of a faculty member and a recognized professional person in an organization.

680. Organizational Behavior Research Report. (3)

Writing and defending a report about the student's work experience in an organization.

Management Communication

642. Communication for Professional Accounting. (1.5)

Prerequisite: MCom 320, 321, or equivalent.

Theory and application of written and oral communication for professional accounting.

FACULTY

CHERRINGTON, DAVID J., *Professor.* DBA, Indiana University, Bloomington, 1970. Personnel Management; Organizational Behavior and Ethics.

CLARKE, DARRAL G., *Professor.* PhD, Purdue University, 1972. Strategy Paradigms; Market Analysis and Decision Making; Planning for Small Businesses.

DAINES, ROBERT H., *Professor.* DBA, Indiana University, 1966. Finance and Strategy.

DETIENNE, KRISTEN B., *Assistant Professor.* PhD, University of Southern California, 1991. Organizational Communication.

DYER, W. GIBB, JR., *Professor.* PhD, Massachusetts Institute of Technology, 1984. Organizational Culture; Entrepreneurship; Management of Family-Owned Firms.

GODFREY, PAUL C., *Assistant Professor.* PhD, University of Washington, 1994. Strategic Development; Philosophy of Science and Man; Organizational Theory.

GREGERSEN, HAL B., *Associate Professor.* PhD, University of California, Irvine, 1989. Organizational Change; International Management; Cross-Cultural Management.

HANSEN, MARK H., *Assistant Professor.* PhD, Texas A&M, 1996. Strategic Alliances; Trust and Cooperation; Strategy and Entrepreneurship Issues.

JACKSON, W. BURKE, *Associate Professor.* PhD, Stanford University, 1978. Manufacturing Strategy; Production and Operation Management; Business Strategy and Business Policy.

KIRKHAM, KATE L., *Associate Professor.* PhD, Union Graduate School, 1977. Organizational Development; Diversity.

MEEK, CHRISTOPHER B., *Associate Professor.* PhD, Cornell University, 1983. International Development; Cross-Cultural Analysis in Organizational Behavior; Labor-Management Cooperation.

PERRY, LEE T., *Professor*. PhD, Yale University, 1982. Strategies in Declining Organizations; Behavioral Implications of Mergers and Acquisitions; Radical Product Innovation.

SANDERS, W. GERARD, *Assistant Professor*. PhD, University of Texas, Austin, 1996. Corporate Governance; Mergers and Acquisitions; Executive Compensation.

WHETTEN, DAVID A., *Professor*. PhD, Cornell University, 1974. Organizational Theory; Management Skills; Organizational Identity.

WILKINS, ALAN L., *Professor*. PhD, Stanford University, 1979. Organizational Culture and Control.

WOODWORTH, WARNER P., *Professor*. PhD, University of Michigan, 1974. Industrial Democracy; Worker Ownership; International Development.

PHILOSOPHY

Chair: K. Codell Carter

3196 JKHB
Provo, UT 84602-6279
(801) 378-2721

THE PROGRAM OF STUDIES

The study of philosophy cultivates critical and analytical skills and is, therefore, an excellent complement to any graduate program. Specific requirements of the minor can be adapted to the needs and interest of the student.

The Department of Philosophy offers a graduate minor but not a graduate major.

Philosophy—Minor

Philosophy students study significant texts and analyze issues in diverse disciplines. In doing so, they gain basic habits of mind needed for mature and responsible judgment.

Requirements for the Minor.

- Master's level: an approved 9 hours.
- Doctoral level: an approved 15 hours.

Students should direct inquiries about courses and graduate committee members to the department chair.

COURSE DESCRIPTION

501R. Graduate Seminar. (2-5)

Prerequisite: instructor's consent.

Selected topic, figure, or movement in philosophy, as announced in current class schedule.

FACULTY

For faculty listings, refer to the BYU Undergraduate Catalog.

PHYSICAL EDUCATION

Chair: Earlene Durrant

Graduate Coordinator: Joyce Harrison

214 RB
Provo, UT 84602-2114
(801) 378-4271

THE PROGRAM OF STUDIES

The mission of the Department of Physical Education encompasses the larger university mission in that we also wish to assist individuals in their quest for perfection and eternal life, emphasizing the truth that "the human body is sacred, the veritable tabernacle of the divine spirit." Our supporting mission is to (1) understand and advance the body of knowledge unique to physical education, (2) prepare physical educators to go forth in society to serve in the broad fields of the discipline in ways that foster dignity and respect for the human body, and (3) provide experiences that will stimulate the acquisition and enjoyment of sport and fitness skills that can be used throughout life to foster health and happiness.

The Department of Physical Education has the following graduate program objectives:

- To provide a scholarly approach to physical education through careful research and rigorous intellectual inquiry.
- To develop and train qualified professionals in physical education.
- To develop scholars in physical education who can extend the body of knowledge.

The following degrees are offered through the Department of Physical Education: Physical Education—MS; Curriculum and Instruction in Physical Education—PhD; and Exercise Science/Wellness—PhD.

About twenty-five students are admitted into the graduate programs each year, approximately seventeen in the MS program and the remainder pursuing doctorate degrees.

Most students complete the MS degree in two years and the PhD degree in three and a half years.

Physical Education—MS

Candidates who have a scholarly interest in the science or pedagogy of physical education are encouraged to pursue this degree.

Areas of specialization: Health Promotion, Exercise Physiology, Athletic Training, Physical Education—Pedagogy.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Achieve satisfactory score on GRE.
- GPA: minimum 3.0 for last 60 hours of undergraduate work.
- Submit a statement of intent that includes the following information about the applicant: (1) preparation and background for the program, (2) desired emphasis, (3) basic reasons for career choice, (4) special qualities and talents that would enhance success, (5) research interests, (6) professional goals, (7) particular reasons for applying to BYU, (8) specific duration for accomplishing graduate degree, and (9) any specific circumstances or objectives to be considered (optional).
- Prerequisite: see prerequisites with each specialization.

Requirements for Degree.

- Credit hours: minimum 30–31, with 24–25 being course work hours, plus 6 thesis hours (PE 699R) within the following areas of specialization.
- Areas of specialization: the four areas have the following in common:
 - Prerequisite: a baccalaureate degree in physical education or a baccalaureate degree in a related field and completion of PE 361, 362, 363, 367, or equivalents.
 - Core courses (12 hours): PE 630, 631, 691, 699R (thesis, 6 hours).

Health Promotion

—Prerequisite: in addition to the above prerequisite and core courses,

the following undergraduate courses (or equivalent) must be completed before commencing the MS degree: PE 301, 302, 468.

—Required courses (18–19 hours): PE 599R (3 hours); 661, 666, 667, 669, 671, 673.

Exercise Physiology

—Prerequisite: in addition to the above prerequisite and core courses, the following undergraduate courses (or equivalent) must be completed before commencing the MS degree: college physics; Math 110; Chem 481; Zool 460; PE 301, 302, 468, 469.

—Required courses (12 hours): PE 666, 667, 669; Zool 565.

—Electives: select 6 hours from Chem 584; Zool 526, 566, 589R (CV); PE 659, 662, 663, 671, 673, 693R (1 hour), 766, 769.

Athletic Training

—Prerequisite: in addition to the above prerequisite and core courses, those not NATA certified must take PE 301, 302, 415, 416, 417, 418. The MS degree with specialization in Athletic Training and NATA certification can be earned by completing 5 additional hours of PE 629R (6 hours total) and the following courses:

—Required courses (17 hours): PE 560; 620; 621; 622; 629R (1 hour); 666; 667; 693R (2 hours).

—Elective (one of the following): PE 662, 663, 668.

Physical Education—Pedagogy (Sport Pedagogy)

—Prerequisite: in addition to the above prerequisite and core courses, candidates must have taken PE 300, 302, 468, or equivalents.

—Required courses (16 hours): PE 582, 649, 650, 651, 652, 658.

—Electives (one of the following): PE 653, 654, 655, 659.

Curriculum and Instruction in Physical Education—PhD

The PhD program in curriculum and instruction in physical education is a three-year program designed to prepare graduates to become university or college professors, or program

directors or consultants at the elementary, secondary, or college levels.

Admission and Entry.

- Application deadlines: see MS.
- Achieve satisfactory score on GRE.
- GPA: minimum 3.5 for last 60 hours.
- Statement of intent: see MS. Also document your fitness and skill proficiencies, including the following: (A) Describe your current physical fitness level for cardiovascular endurance, strength, and flexibility. (B) Describe your current program for physical fitness. (C) In what sports do you consider you have a high level of proficiency? Describe past participation on varsity teams, in tournament play, etc. (D) What sports can you teach effectively? Describe your past teaching experiences in the public schools or at the college level.
- Prerequisite: baccalaureate degree in physical education or a related field, with competence equivalent to the following:
 - Historical, philosophical, and sociological foundations of physical education (PE 300, 302), measurement and evaluation (PE 360), motor learning (PE 361), kinesiology and biomechanics (PE 362), physiology of activity (PE 366), PE 797R for candidates who have not written a thesis. These candidates must produce a publishable research manuscript before beginning work on a dissertation. (This is prerequisite and will not count toward the 63 hours.)
 - Foundational science competencies: college mathematics (Math 110) human development (FamSc 210), sport and law (PE 653).
 - Two years of successful professional experience with an adequate background in the intended area of specialization.
- It is recommended that applicants have at least one degree (BS, MS) from a university other than BYU.

Requirements for Degree.

- Credit hours: minimum 63 hours beyond the bachelor's degree (includes dissertation), in addition to the skill requirement and

prerequisite courses. Students who have earned a master's degree must complete at least 36 hours of additional graduate work.

- Skill requirements: all students need PE 691 (during the first semester on campus), the equivalent of Stat 510, 511, 512. Prerequisites for the various supporting courses are also considered skills.
- Core requirements: IP&T 620; PE 630, 649, 650, 651, 652; 654 or 655; 658, 659, 751, 752, 753, 754, 755, 797R, 799R.
- Supporting courses: minimum 12 hours of graduate credit in approved related area(s) outside the Department of Physical Education. Areas must be approved by the student's committee.
- PhD students must register for at least two consecutive 6-hour semesters on the BYU Provo campus.
- Dissertation.
- Examinations: (A) comprehensive examination; (B) oral defense of dissertation.

Exercise Science—PhD

The PhD in exercise science/wellness is designed to prepare students for leadership at the highest level of their profession. Since most of the students who receive PhDs will become university or college faculty and will teach and publish in their chosen area, students must be (1) well trained in the scientific basis of exercise science, (2) well acquainted with the scientific literature, and (3) able to do independent research.

Admission and Entry.

- Application deadlines: see MS.
- Achieve satisfactory score on GRE.
- GPA: minimum 3.5 for last 60 hours.
- Statement of intent: see MS.
- Prerequisite: baccalaureate degree in physical education or related field, with competence equivalent to the following:
—Historical, philosophical, and sociological foundations of physical education (PE 301, 302), measurement and evaluation (PE 360),

motor learning (PE 361), kinesiology and biomechanics (PE 362), physiology of activity (PE 363), and problems in conditioning (PE 468). PE 797R for candidates who have not written a thesis. These candidates must produce a publishable research manuscript before beginning work on a dissertation. (This is prerequisite and will not count toward the 60 hours.)

—Foundational science competencies: anatomy and physiology (Zool 260, 355), college chemistry (Chem 105, 106), college mathematics (Math 110).

- It is recommended that applicants have at least one degree (BS, MS) from a university other than BYU.

Requirements for Degree.

- Credit hours: minimum 61 hours beyond the bachelor's degree (includes dissertation) in addition to skill requirement and supporting area prerequisites. Students who have earned a master's degree must complete at least 36 hours of additional graduate work.
- Skill requirements: all students in this program need the equivalent of Stat 510, 511, 512. Prerequisites for the various supporting areas are also considered skills. All doctoral students must complete an original research study and present it at a regional, national, or international conference or submit a manuscript to a refereed journal. PhD students will also be required to teach two professional courses.
- Core requirements: PE 630, 666, 667, 669, 671, 693R (4 hours), 751, 753, 797R, 799R, and 6 hours from PE 658, 661, 673, 766, 769, Hlth 666, IP&T 560 and above.
- Supporting areas: minimum 9 hours of graduate credit, with prerequisites, must be included in two related areas, or 18 hours in one approved related area: nutrition, exercise physiology/zoology, exercise epidemiology/statistics, biomechanics, therapeutic exercise, or motor learning. Other areas may be approved by the student's committee. If two 9-hour supporting areas are used, at least 6 hours

must be from outside the College of Health and Human Performance; if one 18-hour supporting area is used, the majority of courses must be from outside the college. No more than 9 hours of supporting area course work may be transferred from another university, and one member of each student's committee must be from outside the college.

- PhD students must register for at least two consecutive 6-hour semesters on the BYU Provo campus.
- Dissertation.
- Examinations: (A) comprehensive examination; (B) oral defense of dissertation.

FINANCIAL ASSISTANCE

Financial assistance is available in the form of graduate teaching assistantships. The graduate student will teach physical education activity or required laboratory classes.

RESOURCES AND OPPORTUNITIES

The Department of Physical Education utilizes the Human Performance Research Center. The primary purpose of the center is to support applied and basic research programs of faculty and graduate students on such topics as nutrition and exercise, drugs and exercise, exercise and cardiovascular disease, exercise and weight control, and other contemporary issues in exercise science.

Other resources exist in these areas:

Anatomy: five cadavers and skeletons.

Biomechanics: three-dimensional video analysis, force plate analysis, and electromyographic analysis equipment.

Exercise Biochemistry: biochemical analysis, and muscle biopsy equipment.

Human Performance: treadmills, bicycle ergometers, hydrostatic weighing facility, and EKG units.

Small Animal Facility: 200 animal cages and tissue traumatizer.

Athletic Training: one large well-equipped facility plus two satellite training rooms located in the Marriott Center and football stadium.

Motor Learning: devices for measuring learning, speed of movement, and reaction time.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

550. Motor Development and Growth of Children. (2)

Existing body of knowledge regarding motor development of children and significance of physical activity in early childhood.

560. Orthopaedic Pathomechanics. (2)

Prerequisite: PE 460 or equivalent.

Advanced analysis of neuromusculoskeletal deformities, and/or injury. Therapeutic exercise and the use of orthoses.

582. Physical Education for Special Populations. (2)

Prerequisite: baccalaureate degree in physical education.

Theoretical and practical aspects of teaching individuals with disabilities.

586R. Workshop in Fitness and Sport. (1-4)

Prerequisite: undergraduate major in physical education or equivalent.

599R. Academic Internship: Practicum. (1-9)

Prerequisite: PE 468 or concurrent registration for conditioning coaches.

Field experience for physical education students; fifty hours of volunteer service in approved organization required per credit hour.

620. Advanced Athletic Training. (3)

Prerequisite: PE 415, 416, 417, 418; or equivalents.

Advanced theory and practical skills in prevention, immediate care, and treatment of injuries.

621. Physical Examination and Rehabilitation of Athletic Injuries. (2)

Prerequisite: PE 415, 416, 417, 418; or equivalents.

For athletic training students. Specific rehabilitation programs for specific injuries; examining the injury.

622. Therapeutic Modalities in the Treatment of Athletic Injuries. (2)

Prerequisite: PE 415, 416, 417, 418.

For athletic training students. Hydrotherapy, massage, traction, radiant energy, heat, cold, and electrotherapy.

629R. Athletic Training Practicum. (1-6)

Prerequisite: PE 415, 416, 417, 418.

Academic and practical application of athletic training skills in the training room setting.

630. Research Methods in Physical Education. (3)

Prerequisite: PE 360 or equivalent.

Understanding, designing, and conducting research; writing for publication in physical education.

631. Research Design in Physical Education. (2)

Prerequisite: PE 360 or equivalent.

Designing, conducting, and analyzing data for experimental and survey research studies in physical education using standard statistical procedures.

649. Curriculum Theory and Design in Physical Education. (3)

Theoretical and practical aspects of curriculum design in physical education.

650. Measurement and Evaluation in Physical Education. (2)

Prerequisite: PE 631 or Stat 510, or concurrent registration.

Instruments and procedures for psychomotor, fitness, cognitive, and affective assessment in physical education.

651. Personnel Management and Supervision in Physical Education. (3)

Theory and practice of successful personnel management and supervision in physical education.

652. Administration of Physical Education and Athletic Programs. (3)

Administration and management of physical education, athletics, and related programs and the role of public relations in these programs.

653. Sport and the Law. (2)

Analysis of legal liabilities and issues related to working with programs in physical education and athletics.

654. History of Physical Education. (3)

Review and analysis of historical facts and events in physical education and sports.

655. Philosophy: Ethics and Issues. (2)

Ethical and moral interpretations and concepts underlying the profession.

656. Psychological Implications of Sport. (2)

Prerequisite: graduate standing; Psych 111, PE 450, or equivalent.

Psychological phenomena inherent in sport as they relate to the teacher/coach, participant, and spectator.

657. Sport and Society. (2)

Prerequisite: PE 300 or equivalent.

Relationship of sport to other elements of society, emphasizing the twentieth century.

658. Learning Theory, Sport Pedagogy, and Instructional Design in Physical Education. (3)

Prerequisite: PE 659.

Systematic approach to designing and evaluating cognitive, psychomotor, and affective instruction in physical education.

659. Theory of Motor Learning. (2)

Prerequisite: PE 361.

Theories and methods of learning physical skills.

661. Fitness and Wellness in the Workplace. (3)

Management for effectively designing, marketing, implementing, and administering health promotion programs.

662. Mechanical Analysis of Activities. (2)

Prerequisite: PE 362 or equivalent.

Analysis of human movement and sport activities using kinematic and kinetic descriptions and models of motion based on three-dimensional video and force plate techniques.

663. Research Techniques in Biomechanics of Sport. (2)

Prerequisite: PE 362, 662.

Theory and practice of research techniques in biomechanics: statics, dynamics, body segment parameters, photo instrumentation, electronic instrumentation, digital computer techniques, literature sources, and laboratory fundamentals.

666. Exercise Physiology. (3)

Prerequisite: PE 363.

Adjustments made by the body to accommodate physical activity.

667. Laboratory Methods and Procedures. (2)

Prerequisite: PE 363; 666 or concurrent registration.

Basic techniques and procedures used in human performance laboratories.

668. Pathomechanical Human Anatomy. (3)

Prerequisite: Zool 260, PE 469; or equivalents.

Regional anatomy, emphasizing role of anatomy in etiology, recognition, evaluation, and rehabilitation of athletic injuries and orthopaedic impairments. Students dissect cadavers.

669. Exercise, Testing, and Prescription in Coronary Heart Disease. (2)

Coronary heart disease: risk factors, symptoms, and interventions; role of exercise in testing, prescription, and rehabilitation.

671. Health Risk Management. (3)

Prerequisite: PE 661, 666, 667.

Management of health risks, particularly those relating to cardiovascular disease, cancer, and obesity.

673. Obesity and Weight Management. (3)

Etiology, treatment, and prevention of obesity in various populations, emphasizing the role of exercise in weight control programs.

685. Physical Education in the Elementary School. (2)

For teachers, administrators, and supervisors. Curricular interrelationships and content materials directed toward obtaining educational results.

691. Seminar. (1)

Orientation to graduate work in physical education.

693R. Graduate Seminar in Readings. (1)

Prerequisite: PE 666 or concurrent registration for exercise physiology section.

Weekly seminar covering selected topics in physical education. Doctoral students in exercise science should enroll each semester.

699R. Master's Thesis. (1-9)**751. Doctoral Seminar: Professional and Scholarly Writing. (1)****752. Doctoral Seminar: Teaching Physical Education in Higher Education. (1)****753. Doctoral Seminar: Research and Grantsmanship. (1)****754. Doctoral Seminar: Program Management. (1)****755. Research on Teaching and Teacher Evaluation in Physical Education. (2)**

Prerequisite: PE 659.

Review of research on teaching and teacher evaluation affecting teaching and administration of physical education.

766. Advanced Exercise Physiology: Cardiopulmonary. (3)

Prerequisite: PE 666, 667.

Cardiovascular and pulmonary systems and how they meet the metabolic needs of muscles during exercise.

769. Advanced Exercise Physiology: Skeletal Muscle. (3)

Prerequisite: PE 666, Chem 481.

Effects of acute and chronic exercise on anatomy, physiology, and biochemistry of skeletal muscle.

797R. Individual Research and Study in Physical Education. (1-9)

Prerequisite: undergraduate major in physical education; matriculation for graduate study in the department.

799R. Doctoral Dissertation. (1-18)**FACULTY**

ALDANA, STEVE, *Associate Professor.*

PhD, Arizona State University, 1991. Exercise Science; Wellness.

ALLSEN, PHILIP E., *Professor.* EdD, University of Utah, 1965. Exercise Physiology; Physical Fitness.

BARKER, RUEL M., *Professor.* EdD, Brigham Young University, 1971. Elementary Physical Education; History of Physical Education.

BLAKEMORE, CONNIE L., *Professor.* EdD, Temple University, 1984. Sport Pedagogy.

CLARKE, MARK S., *Associate Professor.* EdD, Brigham Young University, 1971. Elementary Physical Education; Motor Development.

CONLEE, ROBERT K., *Professor.* PhD, University of Iowa, 1975. Exercise Physiology.

DRAPER, DAVID O., *Professor.* EdD, Northern Illinois University, 1988. Athletic Training.

DURRANT, EARLENE, *Professor.* EdD, Brigham Young University, 1975. Athletic Training.

GEORGE, JAMES D., *Assistant Professor.* PhD, Arizona State University, 1995. Exercise and Wellness.

HALL, LARRY T., *Associate Professor.* PhD, University of Utah, 1976. Motor Learning.

HARRISON, JOYCE M., *Professor.* EdD, Brigham Young University, 1973. Curriculum and Instructional Design.

HAWKES, NENA, *Associate Professor.* PhD, Union Institute, 1993. History; Sport Pedagogy.

KNIGHT, KENNETH L., *Professor.* PhD, University of Missouri, 1977. Athletic Training.

LOCKHART, BARBARA D., *Professor*.
EdD, Brigham Young University,
1971. Administration; Ethics and
Philosophy.

MYRER, WILLIAM, *Associate Professor*.
PhD, Brigham Young University,
1983. Correctives and
Rehabilitation.

PARCELL, ALLEN C., *Assistant
Professor*. PhD, Ball State
University, 1998. Exercise
Physiology.

PENNINGTON, TODD R., *Assistant
Professor*. PhD, Virginia
Polytechnic Institute and State
University, 1998. Curriculum and
Instruction—Sport Pedagogy.

RICARD, MARK, *Associate Professor*.
PhD, Southern Illinois University,
1986. Kinesiology; Biomechanics.

SCHULTHIES, SHANE S., *Associate
Professor*. PhD, Brigham Young
University, 1991. Correctives and
Rehabilitation.

SILVESTER, L. JAY, *Associate Professor*.
EdD, Brigham Young University,
1976. Physical Fitness; Health
Promotion.

TUCKER, LARRY A., *Professor*. PhD,
Southern Illinois University, 1981.
Health Promotion; Research
Methods.

WILKINSON, CAROL, *Assistant
Professor*. EdD, Brigham Young
University, 1983. Pedagogy.

ZANANDREA, MARIA, *Assistant
Professor*. EdD, Brigham Young
University, 1992. Physical
Education for Special
Populations.

PHYSICS AND ASTRONOMY

Chair: Dorian M. Hatch

Graduate Coordinator: Jean-François
S. Van Huele

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THE PROGRAM OF STUDIES

The Department of Physics and Astronomy is committed to excellence in scholarship. It is actively engaged in scholarly research, contributing to the worldwide development of its scientific disciplines. It integrates those activities into the graduate programs, allowing its graduate students to experience firsthand the excitement of discovering new knowledge.

Three degrees are offered through the Department of Physics and Astronomy: Physics—MS, Physics—PhD, and Physics and Astronomy—PhD.

The average number of MS and PhD students in the department is fifteen and twenty, respectively. The expected time to complete a degree is two years for the MS and five years for the PhD.

Physics—MS

The master of science degree is sometimes sought by those who intend to continue on for the PhD, but it also serves as a terminal degree for those who intend to work in industrial or governmental research or teaching.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Entrance examination: GRE advanced physics subject test.
- Prerequisite: baccalaureate degree in physics or equivalent.
Appropriate course work will be suggested by graduate advisor for

removing deficiencies in undergraduate study.

Requirements for Degree.

- Credit hours (30): minimum 24 approved course work hours (which may include up to 6 hours of Phscs 697R but may not include Phscs 591R or 597R), plus 6 thesis hours (Phscs 699R).
- Required course: Phscs 591R each semester of residence; Phscs 597R first two semesters of residence.
- Thesis.
- Examinations: final oral examination and defense of thesis.

Before admission to candidacy, a student must be accepted as a research student by a member of the faculty of the Department of Physics and Astronomy and submit a proposed study list. The study list is normally completed by the beginning of the second semester of graduate study.

Physics, Physics and Astronomy—PhD

The PhD program prepares students for professional careers in physics and astronomy. These careers include faculty positions at universities and work in research laboratories. Most students who intend to receive the PhD do not enter the MS program.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Entrance examination: GRE advanced physics subject test.
- Prerequisite requirements: applicants should have completed a baccalaureate degree in physics or astronomy or have equivalent preparation.

Requirements for Degree.

- Credit hours (63): minimum 45 hours in approved course work (B- grade or better in each class) exclusive of graduate seminars (see Phscs 591R, 597R); plus dissertation (18 hours minimum, Phscs 799R).
- Required core courses: Phscs 591R each semester of residence; Phscs

597R first two semesters of residence.

Physics Degree: Phscs 517, 518, 621, 641, 642, 651, 652.

Physics and Astronomy Degree:

seven courses from Phscs 517, 518, 527, 528, 621, 641, 642, 651, 652, subject to department's approval.

- Required courses in physics: at least 12 hours from course offering in Physics Department, subject to department's approval. No duplication is permitted between these 12 hours and the student's chosen core courses.
- Skills requirement: select one of the four following options (the selection along with the details are subject to department's approval). No duplication is permitted between the skills requirement and the required courses above:
Option 1: 18 hours of approved course work with a B- grade or better. Refer to department graduate handbook for specific suggestions.
Option 2: demonstrate competence equivalent to 18 hours of course work. The department involved must certify competence.
Option 3: professional internship. Professional certification of competence is needed.
Option 4: combinations of the above.
- Study list: before admission to candidacy a student must be accepted as a research student by a member of the department faculty and submit a proposed study list, which must be approved by the department. The study list should be completed during the first year of graduate study.
- Prospectus: a proposed subject of research must be defended in public and submitted to the department for approval.
- Comprehensive written and oral examinations: taken after completion of required core courses. These examinations are regularly scheduled each year near the beginning of fall semester.
- Dissertation.
- Examinations: final oral examination and defense of dissertation.

FINANCIAL ASSISTANCE

Qualified graduate students receive financial aid that may take the form of one or more of the following: teaching assistantships, research assistantships, scholarships (including the John Einar Anderson Scholarship), internships, university-sponsored fellowships, or tuition awards. The amount of financial aid given depends on individual merit.

RESOURCES AND OPPORTUNITIES

Within the department there are currently six recognized research specialties: acoustics; astrophysics and astronomy; atomic, molecular, and optical physics; condensed matter physics; plasma physics; theoretical and mathematical physics.

Acoustics. The acoustics research program at BYU is strongly cross-disciplinary in character and focuses on the following areas: musical acoustics, speech acoustics, active noise and vibration control, and sound-structure interaction. The research in acoustics is both experimental and computational in nature and includes simulation and measurement of physical systems, as well as signal processing. Computer facilities are readily available with a number of powerful software packages. In addition, the laboratory is equipped with state-of-the-art acoustic measurement equipment and an anechoic chamber that can be used for experimental verification studies.

Astrophysics and Astronomy. Most research in astrophysics and astronomy is observational. Much of it conducted with the BYU twenty-four-inch telescope at West Mountain Observatory, twenty miles southwest of campus, which, at 6,800 feet elevation, is a relatively dark, haze-free site. There is also frequent use of observatories in Arizona, California, and Chile. Topics of current or recent research include the evolutionary status of variable stars, especially classical and dwarf Cepheids; the

reliability of secondary photometric standards; population II stars; interstellar reddening; the development status of both old and young galactic star clusters; globular star clusters; the galaxian luminosity function; and the photometry of rich galaxy clusters and of galaxies in or near cosmic voids.

Atomic, Molecular, and Optical Physics. This group is involved in cross-disciplinary applied research in X-ray laser development and spectral diagnosis of the gain medium; X-ray optics development using multilayers and structures with nanometer dimensions; the study of extremely high-intensity laser interactions; the use of particle-induced X-ray emission for analysis of trace elements present in material samples; investigations of sonoluminescence where bubbles in liquid metals collapse violently, producing short flashes of visible and UV light; and accurate numerical computation of the interaction of electromagnetic and acoustic waves with resonant-sized objects.

Condensed Matter Physics. Condensed matter physics includes a wide range of topics relating to solids and liquids. Nationally, this is the largest and most active area of physics research. Our interests at BYU center on the optical, structural, and dynamic properties of solids, using experimental, theoretical, and computational methods. Our current activities include ultrafast laser studies and nonlinear optics in semiconductors; group-theoretical methods applied to phase transitions in crystals; motion and structure of defects in crystals; and phase transitions at high pressure.

Plasma Physics. Plasma physics research, both experimental and theoretical, centers on the relatively new area of nonneutral plasmas. New experimental techniques are being developed to measure the distribution function of these plasmas in both configuration and velocity space. The response of the plasma to both static and time-dependent perturbations is being studied. The

theoretical work being done attempts to extend the mathematical description of these plasmas beyond the simple approximate geometries and fluid models that have been used in the past.

Theoretical and Mathematical Physics. Research in this area studies the foundations, techniques, and some applications of quantum theory and relativity: methods of Bayesian statistics for accurate physical interpretation of quantum measurements and quantum information theory; study of the interaction between radiation and matter in electron theory and quantum electrodynamics; modeling of radiation fields of molecules; molecular dynamics of defects and impurities in clusters and solids; algebraic methods applied to energy transfer in molecular systems; using differential forms, Backlund transformations, and symmetry groups to search for methods of finding exact solutions for certain partial differential equations of mathematical physics, including those of general relativity.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

512. Computational Physics. (3)
Prerequisite: Phscs 318, Math 434; or equivalent.

Computational methods for problems that occur in physics research, including ordinary and partial differential equations, nonlinear equations, integration, linear algebra, and signal processing.

513R. Special Topics in Contemporary Physics. (1-3)

Prerequisite: instructor's consent.

Topics generally related to recent developments in physics.

517, 518. Mathematical Physics. (3 ea.)

Prerequisite: Phscs 318, Math 434.

Topics in modern theoretical physics, including applications of matrix and tensor analysis and linear differential and integral operators.

529. Observational Astrophysics. (3)
Prerequisite: Phscs 427, 428.

Applied techniques of observational astrophysics, emphasizing practical experience in optical data acquisition and analysis.

545. Introduction to Plasma Physics. (3)

Prerequisite: Phscs 321, 431, 441.

Introduction to plasma physics, including single-particle motion and both fluid and kinetic models of plasma behavior.

546. Plasma Transport. (3)

Prerequisite: Phscs 545.

Transport processes in plasmas applied to space physics, fusion, and laser plasmas.

561. Fundamentals of Acoustics. (3)

Generation, transmission, and reception of sound. Vibrating systems, properties of elastic media, mechanical and electrical energy, and radiation.

562. Applied Acoustics. (3)

Prerequisite: Phscs 561 or instructor's consent.

Acoustic transducers, spectral analysis, waves in ducts and enclosures, higher-order acoustic sources, fan noise, jet noise, passive noise vibration control, active noise vibration control.

565. Acoustics of Music and Speech. (3)

Prerequisite: Phscs 561 or instructor's consent.

Sound production and perception, techniques for analysis and synthesis, computer modeling, machine recognition, and ensemble effects.

566. Acoustics of Enclosures and Interacting Structures. (3)

Prerequisite: Phscs 561, 562; or instructor's consent.

Acoustic fields in enclosures, reverberation time, low- and high-model density fields, sound-structure interaction, transmission through panels, isolation techniques, and advanced noise vibration control.

571. Laser Physics. (3)

Prerequisite: Phscs 222, Math 241; basic understanding of atomic physics and optics.

Physics of coherent radiation throughout the electromagnetic spectrum, including amplification and laser cavities. Discussion based on quantum mechanical principles, but mathematical treatment classical.

581. Solid-State Physics. (3)

Prerequisite: Phscs 222 or equivalent.

Introduction for students in physics, chemistry, geology, and engineering. Phenomena occurring in solids, and their related physical concepts.

585. Thin-Film Physics. (3)

Prerequisite: Phscs 222 or equivalent.

Preparation, characterization, use, and special properties of modern thin films. Interdisciplinary treatment. Of interest to students in applied physics and engineering.

591R. Colloquium. (0.5)

Required of all graduate students every semester in residence.

597R. Introduction to Research. (0.5)

One or two research areas to be selected. Twenty hours of participation required each semester.

599R. Academic Internship. (2-9)

Prerequisite: department cooperative education coordinator's consent.

Cooperative education internships off campus.

611, 612. Astrophysics. (3 ea.)

Prerequisite: instructor's consent.

Theory of stellar atmospheres and interstellar matter.

617. Advanced Topics in Theoretical Physics. (3)

Applications of tensor analysis, differential geometry, and differential forms to such topics as mechanics, optics, relativity, and fluid dynamics.

618. Advanced Topics in Theoretical Physics. (3)

Introductory group theory. Basic representation theory and developments, with applications to quantum mechanics and molecular and solid-state physics.

619. Advanced Topics in Theoretical Physics. (3)

Prerequisite: Phscs 618.

Advanced group theory. Space groups and lie groups with applications in solid-state physics (energy band representations, phase transitions, etc.), nuclear physics, and quantum field theory (particle classification schemes, etc.).

621. Dynamics. (3)

Prerequisite: Phscs 321.

Advanced treatment of classical mechanics, including Lagrange's and Hamilton's equations, rigid body motion, and canonical transformations.

625. Theory of Relativity. (3)

Prerequisite: Phscs 551, 621.

Review of special relativity and general relativity, with applications to modern astrophysics.

626. Relativistic Astrophysics. (3)

Prerequisite: Phscs 625.

Applications of general relativity to modern astrophysics, including gravitational collapse, black holes, cosmological models, gravitational waves, etc.

627, 628. Advanced Topics in Astrophysics. (3 ea.)

Prerequisite: instructor's consent.

Internal structure of stars; galactic structure.

631, 632. Statistical Mechanics. (3 ea.)

Prerequisite: Phscs 431, 551.

Advanced thermodynamics, classical statistical mechanics, quantum statistics, and transport theory.

641, 642. Mathematical Theory of Electricity and Magnetism. (3 ea.)

Prerequisite: Phscs 442.

Advanced electrostatics and magnetostatics, Maxwell's equations and electromagnetic waves, relativistic electrodynamics, radiation theory, and interaction of matter with electromagnetic fields.

645, 646. Plasma Physics. (3 ea.)

Prerequisite: Phscs 431, 621, 642 for 645; Phscs 645 for 646.

Plasma state of matter, including a description in terms of both individual particles and fluids, with applications.

651, 652. Quantum Mechanics. (3 ea.)

Prerequisite: Phscs 518, 551.

Nonrelativistic quantum mechanics, with applications.

671. X-Ray Physics. (3)

Prerequisite: Phscs 518, 552, 581.

Physical characteristics of X-ray generation, optics, and experimental applications. Methods of X-ray imaging emphasized.

681, 682. Modern Theory of Solids. (3 ea.)

Prerequisite: Phscs 581, 651.

Quantum theory of solids, emphasizing the unifying principles of symmetry, energy-band theory, dynamics of electrons and of periodic lattices, and cooperative phenomena.

697R. Research. (1-6)**699R. Master's Thesis. (1-9)****711R. Advanced Topics in Physics. (1-3)**

Prerequisite: instructor's consent.

Recent and upcoming topics include chaos, thin films, phase transformations, amorphous solids, quantum optics, astronomy using nontraditional frequencies, and particle physics.

751, 752. Advanced Quantum Theory. (3 ea.)

Prerequisite: Phscs 652.

Topics in relativistic quantum mechanics, including quantum field theory.

797R. Research. (1-9)**799R. Doctoral Dissertation. (1-9)****FACULTY**

ALLRED, DAVID D., *Professor*. PhD, Princeton University, 1977. Lasers; X-Rays; Surface Physics.

BERGESON, SCOTT D., *Assistant Professor*. PhD, University of Wisconsin, 1995. Experimental Atomic Physics.

BERRONDO, MANUEL, *Professor*. PhD, University of Uppsala, Sweden, 1969. Theoretical Physics.

CHRISTENSEN, CLARK G., *Associate Professor*. PhD, California Institute of Technology, 1972. Astrophysics.

DAVIS, ROBERT C., *Assistant Professor*. PhD, University of Utah, 1996. Experimental Condensed Matter Physics.

DIBBLE, WILLIAM E., *Professor*. PhD, California Institute of Technology, 1960. X-Rays.

EVENSON, WILLIAM E., *Professor*. PhD, Iowa State University of Science and Technology, 1968. Theoretical Condensed Matter Physics.

HARRISON, B. KENT, *Professor*. PhD, Princeton University, 1959. General Relativity.

HART, GRANT W., *Associate Professor*. PhD, University of Maryland, 1983. Plasma Physics.

HATCH, DORIAN M., *Professor*. PhD, State University of New York, 1968. Theoretical Condensed Matter Physics; Group Theory.

HESS, BRET C., *Associate Professor*. PhD, Iowa State University, 1988. Condensed Matter Physics.

HINTZ, ERIC G., *Assistant Professor*. PhD, Brigham Young University, 1995. Observational Astrophysics.

JONES, STEVEN E., *Professor*. PhD, Vanderbilt University, 1978. Muon Catalyzed Fusion

KNIGHT, LARRY V., *Professor*. PhD, Stanford University, 1965. Lasers; X-Rays.

MASON, GRANT W., *Professor*. PhD, University of Utah, 1969. Plasma Physics.

MCMAMARA, D. HAROLD, *Professor*. PhD, University of California, Berkeley, 1950. Astrophysics.

MERRILL, JOHN J., *Professor*. PhD, California Institute of Technology, 1960. Instructional Design.

MOODY, J. WARD, *Associate Professor.*

PhD, University of Michigan,
1986. Astrophysics.

NELSON, H. MARK, *Professor. PhD,*

Harvard University, 1960.
Condensed Matter Physics.

PEATROSS, JUSTIN B., *Assistant*

*Professor. PhD, University of
Rochester, 1993. High-Intensity
Laser Physics.*

RASBAND, S. NEIL, *Professor. PhD,*

University of Utah, 1969.
Theoretical Plasma Physics.

REES, LAWRENCE B., *Associate*

*Professor. PhD, University of
Maryland, 1983. Nuclear Physics.*

SOMMERFELDT, SCOTT D., *Associate*

*Professor. PhD, Pennsylvania State
University, 1989. Acoustics.*

SPENCER, ROSS L., *Professor. PhD,*

University of Wisconsin, 1979.
Theoretical Plasma Physics.

STOKES, HAROLD T., *Professor. PhD,*

University of Utah, 1977.
Condensed Matter Physics.

STRONG, WILLIAM J., *Professor. PhD,*

Massachusetts Institute of
Technology, 1964. Acoustics.

TAYLOR, BENJAMIN J., *Professor. PhD,*

University of California, Berkeley,
1969. Astrophysics.

TURLEY, R. STEVEN, *Associate*

*Professor. PhD, Massachusetts
Institute of Technology, 1984.
Computational and Atomic
Physics.*

VAN HUELE, JEAN-FRANÇOIS, *Associate*

*Professor. PhD, Brussels Free
University, Belgium, 1987.
Theoretical Physics.*

PSYCHOLOGY

Chair: Erin D. Bigler

Associate Chair/Graduate

Coordinator: Larry E. Wood

Associate Chair/Director of Clinical

Training: David G. Weight

Executive Coordinator of Clinical

Psychology: Elizabeth J. Norton

1001 SWKT

Provo, UT 84602-5543

(801) 378-4287

THE PROGRAM OF STUDIES

The mission of the Psychology Department is to discover, disseminate, and apply principles of psychology within a scholarly framework that is compatible with the values and purposes of Brigham Young University and its sponsor.

Three degrees are offered through the Department of Psychology: Psychology—MS, Psychology—PhD, and Clinical Psychology—PhD.

Students are selected after careful consideration of GPA, GRE scores, letters of recommendation, and areas of academic interest. The average number of years to completion is two and a half for the MS and five for the PhD programs.

Psychology—MS

The master's degree in psychology provides advanced education in preparation for application to doctoral programs; community college, junior college, or high school teaching; and general strengthening of expertise in psychology. It is not intended as a terminal professional degree.

Admission and Entry.

- Semesters of entry and application deadlines: fall, January 31 (U.S. and international).
- Application requirements: minimum required GPA is 3.0 for the last 60 hours.
- Entrance examination: GRE general test.
- Prerequisite: baccalaureate degree in psychology (other fields will be

considered); undergraduate major in psychology desirable. Previous course work should include general psychology, elementary psychological statistics, research design and analysis, and three additional psychology courses.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (699R).
- Required courses: Psych 501, 502 (first two semesters in residence), and three of Psych 510, 520, 540, 550, 560, 565, 575, 583, 605.
- Advisory committee selection: by the end of the first semester students must select their graduate committee and submit their study list.
- Electives: determined in consultation with graduate committee.
- Thesis.
- Examination: final oral examination on course work and defense of thesis.

Psychology—PhD

The doctoral program in psychology offers rigorous educational experience leading to the PhD degree. The first three semesters of the program are designed to provide broad coverage of the substantive areas of the field, training in research skills, and introduction to the particular areas of emphasis offered in the program. During the last two years of the program students will pursue specialized course work and training in one of three emphasis areas: (1) applied social psychology, (2) behavioral neurobiology, (3) theoretical/philosophical psychology. The course work for these emphasis areas will be outlined under the supervision of the student's graduate committee.

During the first year students should select a faculty advisor and a graduate committee. All students will complete a common core of course work during the first three semesters. By the end of the second year in the program, all students will complete an MS degree, including a thesis. Following the completion of these requirements, students will

concentrate on course work and research in the emphasis area they wish to pursue under the direction of the graduate committee.

Admission and Entry.

- Semesters of entry and application deadlines: fall, January 31 (U.S. and international).
- Entrance examination: GRE general test.
- Prerequisite: see MS program.

Requirements for Degree.

- Credit hours (63 plus skill): minimum 45 course work hours plus 18 dissertation hours (799R) and skill requirement hours.
- Required core courses: B grade or better in Psych 501, 502, 510, 540, 550, 560, 575, 583, 600R, 606.
- Sequence of program requirements:
First Year: fall, Psych 501, 550, 560, 605. winter, Psych 502, 540, 583, 606.
Second Year: fall, Psych 575, 600R. By the end of the second year students should have completed and defended a master's thesis.
Third Year: students specialize in emphasis area(s), take course work selected in consultation with their graduate committee, complete skill requirements, and complete the specialty literature review project.
Fourth Year: this year is devoted to finishing course work and training in an emphasis area and to completing the dissertation. Students must complete 18 hours of dissertation credit (Psych 799R) as part of the dissertation requirement.
Note: Psych 510 may be taken any time during the four years.
- Skill requirement: this requirement will be met by completing course work in the areas of mathematics, statistics, or computer science as approved by graduate committee to total 18 hours minimum. If Psych 501 and 502 are used toward completion of this requirement, they may not double count toward the core hour requirement.
- Examinations: by the end of their third year in the program (August), all students will complete and obtain approval on a major literature review in the

emphasis area of their choice. This project should constitute a contribution to the field and demonstrate mastery of a body of research literature.

- Dissertation: by the end of their fourth year in the program, students should complete and defend a dissertation in their chosen emphasis area (including a journal article in a form acceptable for submission appended to the dissertation, unless exempted in individual cases by the dissertation committee and the program chair.)
- Other program requirements: all students will be required to complete a master's thesis by the end of their second year in the program.

Clinical Psychology—PhD

The clinical psychology training program at Brigham Young University is accredited by the American Psychological Association and leads to the PhD degree. This program is ordinarily completed in five years, including a one-year, full-time internship completed in an accredited agency. Candidates with varied backgrounds who have strong academic and clinical promise are recruited.

The philosophy of the clinical training program adheres to the scientist-professional model. Training focuses on academic and research competence as well as theory and practicum experiences necessary to develop strong clinical skills.

The program at Brigham Young University is eclectic in its theoretical approach, drawing from a wide range of theories and orientations in an attempt to give broad exposure to a diversity of traditional and innovative approaches. All students receive a basic core of training in adult clinical psychology. They may also elect to take a special emphasis in (1) Child, Adolescent, and Family; (2) Clinical Neuropsychology; (3) Clinical Research, or (4) Values, Religion, and Mental Health.

Admission and Entry.

- Semesters of entry and application deadlines: fall, January 31 (U.S. and international).
- Entrance examination: GRE general test.
- Prerequisite: course work in introductory and abnormal psychology; research design and analysis; statistics; personality; learning or cognition; and tests and measurements.

Requirements for Degree.

- Credit hours (124 minimum).
- Skill requirements: undergraduate statistics (3 hours); undergraduate research design and analysis (3 hours); research methodology (9 hours): Psych 500R (Measurement), Psych 500R (Design), Psych 500R (Clinical Research); graduate statistics (10 hours): Psych 501, 502.
- General core courses (B grade or better): biological bases of behavior (6 hours): Psych 583 or 585; 687R; social-cultural bases of behavior (6 hours): Psych 555, 645; cognitive-affective bases of behavior (3 hours): Psych 560 or 575; human development (3 hours): Psych 520; history and systems (3 hours): Psych 510; ethics and standards (3 hours): Psych 609.
- Clinical courses: assessment (9 hours): Psych 622, 623, 624; psychotherapy (12 hours): Psych 651, 652, 653, 654 (654 is strongly recommended but not required for neuropsychology students); personality and psychopathology (7 hours): Psych 611, 675; practicums, clerkships, and case conferences (29 hours minimum): Psych 740R, 741R, 743R; internship (6 hours): Psych 745, 746, 747, 748; dissertation (18 hours): Psych 799R.
- Emphasis sequences: a sequence of elective courses may be taken in the following emphasis areas: Child, Adolescent, and Family; Clinical Neuropsychology; Clinical Research; Values, Religion, and Mental Health.
- Dissertation (including a journal article in a form acceptable for submission appended to the dissertation) to be completed before internship.

- **Internship:** one-year internship in a setting approved by the clinical director. Before going on internship, students complete all other requirements.
- **Examinations:** (A) comprehensive examinations in first, second, and third years; (B) oral defense of dissertation.

For additional information about the program, write or call the secretary or the director of Clinical Training, 284 TLRB, Provo, UT 84602-8610, telephone (801) 378-4050.

FINANCIAL ASSISTANCE

Departmental financial aid is manifest in various forms: teaching and research assistantships, student instructorships, and tuition awards.

RESOURCES AND OPPORTUNITIES

Comprehensive Clinic. This clinic is a unique interdisciplinary training and research facility housing the finest video and computer facilities available and a staff of skilled technicians and secretaries to support graduate student and faculty research. The clinic currently functions as an APA-approved clinical psychology laboratory for the Psychology Department. In addition, the clinic provides the university and the broader geographical community with mental health services, serving between 200 and 250 clients each week. The clinic contains eleven counseling rooms, four seminar rooms, and two large audiology and speech-language pathology classrooms equipped with video cameras and portable playback units. Fourteen small session rooms are equipped for audio recording.

Externship Opportunities. In addition to practicum experiences in the Comprehensive Clinic, the clinical program arranges a number of reimbursed work placements in community agencies as well as four required unpaid clerkship experiences, including Utah State Hospital, Utah State Prison, a facility for children

with developmental disabilities, and a self-selected site. These clerkships and externships are arranged and managed by the executive coordinator of clinical psychology and the director of clinical training and are supervised by on-site licensed professionals, who typically hold adjunct appointments in the Psychology Department. At present, clerkships and externships are available in more than twenty different settings. These opportunities provide an excellent foundation for the integration of classroom experiences with practical work applications.

Family, Home, and Social Sciences Computing Center. The center assists faculty and students with social science data processing and other computing needs on main-frame and personal computers. Technical support and consultation services for both statistics and graphics are available to students working on research projects, theses, and dissertations. Special computer facilities in the Psychology Department include time-share systems. These allow the simultaneous gathering of acoustical and voice perception data from human subjects and the gathering of learning and behavioral economics data from animal subjects.

Psychobiology Research Laboratories. These laboratories are equipped with facilities for brain-behavior analysis. Full histology and electrophysiology laboratories, along with the necessary surgical facilities, are available.

Neuroimaging and Behavior Laboratory. Current research and training in the area of neuroimaging are supported by a laboratory consisting of multiple computer, video, data storage, and printer workstations supported by current software that allow for the capture, processing, isolation, and imaging output of specific areas of the brain from MRI and CT images.

Multivariate Data Visualization Laboratory. Faculty and students interested in the areas of multivariate visualization of data and large-

scale data analysis are supported by a mathematical psychology laboratory consisting of a network of NT and UNIX workstations.

The college also provides additional research and academic support through the Camilla Eyring Kimball Chair of Home and Family Life; the Lemuel H. Redd, Jr., Chair in Western History; the J. Fish and Lillian F. Smith Chair of Economics; and the Family History Services unit.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

500R. Research Methods. (3)

Intermediate course for first-year graduate psychology students, focusing on methodological tactics rather than statistical skills.

501. Data Analysis in Psychological Research 1. (5)

Prerequisite: Psych 301 or Stat 222; or Stat 221, 223.

Using and interpreting major quantitative methods in psychology; some commonly used computer methods.

502. Data Analysis in Psychological Research 2. (5)

Prerequisite: Psych 501 or instructor's consent.

Analysis of variance and covariance, multiple regression, and experimental design; introduction to multivariate methods.

510. History and Systems of Psychology. (3)

Survey of origins and development of modern psychology, including consideration of schools and theoretical systems.

511. Philosophy of Science for the Social Sciences. (3)

Prerequisite: instructor's consent or admission to PhD program.

Issues in philosophy of science as they apply to social sciences, including considerations of method, epistemology, and construction of knowledge.

520. Advanced Developmental Psychology. (3)

Major research in developmental psychology, emphasizing theory, content, and methodology.

531. Organizational Psychology. (3)

Personal and interpersonal aspects of organizational life: goal setting, decision making, problem solving, communication, control, leadership, motivation, and change.

535. Behavior Modification Techniques. (3)

Practical application of behavior modification to academic discipline; emotional target behaviors of individuals and groups.

540. Personality Theory. (3)

Prerequisite: Psych 341 and 5 additional hours in psychology.

Contemporary theories of personality developed within framework of major psychological systems.

550. Theory and Research in Social Psychology. (3)

Prerequisite: Psych-Soc 350 or instructor's consent.

Current theories and research on interaction with others.

552. Applied Social Psychology. (3)

Prerequisite: Psych-Soc 350; graduate standing or instructor's consent.

Overview of domains in which social psychology theory and research have been applied outside the laboratory.

555. (Psych-Soc) Group Dynamics. (3)

Prerequisite: Psych-Soc 350.

Theories and research on small-group processes and mass behavior.

560. Learning Theory. (3)

Prerequisite: Psych 361 and 5 additional hours in psychology.

Critical review of current theories and persistent problems.

565. Motivational Psychology. (3)

Prerequisite: Psych 365 or equivalent; graduate standing or instructor's consent.

Theoretical, historical, and empirical overview; recent trends and issues; role of animal studies; methodological problems.

575. Cognitive Processes. (3)

Prerequisite: Psych 370, 375, or equivalent; graduate standing or instructor's consent.

Major theoretical and empirical developments. Interaction of sensory, perceptual, learning, and thinking processes.

577. (Psych-CS 535) Human/Computer Interaction. (3)

Prerequisite: graduate or senior standing.

Human/machine interfaces for hardware/software integration. Psychological principles of computer interfacing. Human engineering, ergonomics, software design principles for user-friendly applications.

583. Biological and Health Psychology. (3)

Prerequisite: Psych 381, 382, or equivalent.

In-depth examination of biological bases of behavior from perspective of health and disease.

584. Cognitive Neuroscience. (3)

Prerequisite: graduate standing or instructor's consent.

Critical analysis of the neurobiological bases of perception and cognition.

585. Human Neuropsychology. (3)

Prerequisite: Psych 381, 382; or instructor's consent.

Critical study of brain-behavior relationships.

586. Hormones and Behavior. (3)

Prerequisite: Psych 381, 382.

Neural and endocrine mechanisms underlying behavior.

587. Perceptual Processes. (3)

Prerequisite: Psych 370, 381, 382; or instructor's consent.

Critical examination of sensory mechanisms and perceptual organization.

592R. Supervised Teaching Experience. (1-3)

For students receiving supervised teaching experience.

600R. Seminar in Research Methods. (3)

Prerequisite: Psych 501.

Research strategies, methods, and design including measurement, scaling, questionnaire construction, reliability, validity, and experimental and statistical designs.

605. Professional Seminar in Psychology. (1)

Prerequisite: acceptance into PhD program.

Introduction to major research areas in psychology.

606. Professional and Ethical Issues in Psychology. (1)

Prerequisite: acceptance into PhD program.

Ethical issues in professional and scientific psychology.

609. Professional and Ethical Issues in Clinical Psychology. (3)

Prerequisite: acceptance into clinical psychology program.

Ethical issues from a historical and contemporary framework.

610. Theory and Philosophy in Psychology. (3)

Prerequisite: instructor's consent or admission to PhD program.

Philosophical issues underlying psychology, including the nature and importance of theory and theorizing.

611. Psychopathology. (4)

Prerequisite: acceptance into clinical psychology program.

Etiology and symptoms of dysfunctional behavior and their effects on the individual, family, and community.

612. Psychopathology 2: Developmental. (3)

Prerequisite: acceptance into clinical psychology program.

Diagnosis and incidence of maladjustment, learning disabilities, abnormalities and subnormalities, and cultural deficits.

622. Assessment 1: Intelligence. (3)

Prerequisite: acceptance into clinical psychology program.

Methods used in assessing intellectual status in children and adults.

623. Assessment 2: Personality (3)
Prerequisite: acceptance into clinical psychology program.

Methods used in assessing the personality and behavioral characteristics of children and adults.

624. Assessment 3: Rorschach Technique. (3)

Prerequisite: acceptance into clinical psychology program.

Theory and skill training in administering, scoring, and interpreting the Rorschach Test.

625. Advanced Objective Assessment. (3)

Prerequisite: acceptance into clinical or school psychology program.

In-depth look at MMPI.

631. Professional Issues in Organizational Psychology. (3)

Prerequisite: Psych 531.

Consultant involvement in executive and management decision making, focusing on social responsibility and ethics.

640R. Seminar in Personality. (3)

Prerequisite: Psych 540.

Intensive analysis of selected current topics in personality research and theory.

641R. Values, Religion, and Mental Health. (1-3)

Values and religious issues in personality, psychotherapy, prevention, and mental health education.

645. Cultural Diversity and Gender Issues. (3)

Clinical issues in the context of cultural diversity and contemporary social trends.

648R. Seminar in Theoretical/Philosophical Psychology. (3)

Prerequisite: instructor's consent or acceptance into PhD program.

Analysis of theoretical and philosophical issues in the discipline of psychology.

—Role of Theory in Psychotherapy

—Qualitative Research Methods

650R. Seminar in Social Psychology. (3)

Prerequisite: Psych 551 and instructor's consent.

Variable topics including attitude change, social cognition, prosocial and antisocial behavior, group dynamics, and organizational psychology.

651. Psychotherapy 1: Relationship and Psychodynamic (3)

Prerequisite: acceptance into clinical psychology program.

Theory and techniques employed in psychotherapy that focus on relationship and psychodynamic approaches.

652. Psychotherapy 2: Behavior and Cognitive (3)

Prerequisite: acceptance into clinical psychology program.

Theory and techniques employed in psychotherapy that focus on behavioral and cognitive approaches.

653. Psychotherapy 3: Child and Family. (3)

Prerequisite: acceptance into clinical psychology program.

Theory and techniques of child and family therapy.

654. Psychotherapy 4: Group. (3)

Prerequisite: acceptance into clinical psychology program.

Theory and techniques of small-group processes.

655. (Psych-Soc 630) Attitude Measurement and Change. (3)

Prerequisite: instructor's consent.

Attitude development, change, and assessment, focusing on both individual and mass persuasion.

660R. Seminar in Learning. (3)

Prerequisite: instructor's consent.

Critical review of contemporary literature in field of learning psychology.

667R. Seminar in the Experimental Analysis of Behavior. (3)

Prerequisite: instructor's consent.

Intensive overview of current trends and attendant philosophy. Principal attention given to research and philosophical journals.

675. Personality Dynamics. (3)

Prerequisite: acceptance into clinical psychology program.

Theories and applications to clinical situations.

677R. Seminar in Cognitive Processes. (3)

Prerequisite: Psych 575.

Advanced topics in cognitive science and applied artificial intelligence.

678R. Seminar in Mathematical Psychology. (3)

Variable topics including multivariate statistical methods, graphical data analytic techniques, and various mathematical models.

680. Clinical Neuropsychology. (3)

Prerequisite: acceptance into clinical psychology program and Psych 585.

Comprehensive study of the human dysfunctional brain.

684. Advanced Behavioral Neurobiology. (3)

Prerequisite: Psych 381, 382.

Intense examination of contemporary developments in psychobiology and behavioral neurosciences.

685R. Seminar in Behavioral Neurobiology. (3)

Critical examination of topics of current interest taken from contemporary literature.

687R. Seminar in Psychopharmacology. (3)

Prerequisite: Psych 585 or equivalent.

Major classes of psychoactive drugs, emphasizing drug-behavioral interactions.

693. Teaching Psychology. (3)

Prerequisite: enrollment in master's or PhD program.

Prepares graduate students for independent teaching experiences.

694. Psychology Teaching Practicum. (1)

Prerequisite: Psych 693.

Lab portion of Psych 693 entailing actual teaching experience and its supervision.

695R. Independent Readings. (1-3)

Prerequisite: instructor's consent.

Faculty-supervised readings as arranged by student.

697R. Independent Research. (1-4)

Prerequisite: instructor's consent.

Faculty-supervised research as arranged by student.

699R. Master's Thesis. (1-9)

Concluding research for master's program, culminating in final oral examination.

700R. Externships in Clinical Psychology. (0.5)

Supervised reimbursed experience in community agencies.

710R. Readings in Clinical Psychology. (1-3)

Prerequisite: acceptance into clinical psychology program.

Guided individual study in various topics.

711R. Topics in Clinical Psychology. (0.5-3)

Prerequisite: acceptance into clinical psychology program.

Theory and practice in specific topics.

712R. Topics in Neuropsychology. (3)

Prerequisite: Psych 680 and acceptance into clinical psychology program.

Current topics, including adult and child assessment. Other topics as determined by student interest.

740R. Case Conference. (0.5)

Prerequisite: acceptance into clinical psychology program.

Case presentations; professional, ethical, and research issues pertinent to assessment and intervention.

741R. Integrative Practicum. (1-3)

Prerequisite: acceptance into clinical psychology program.

Supervised assessment and intervention, integrating psychopathology diagnosis and treatment.

742R. Projects in Clinical Psychology. (3)

Prerequisite: acceptance into clinical psychology program.

Advanced study or skill training in various areas.

743R. Clerkship. (1-3)

Prerequisite: acceptance into clinical psychology program.

Supervised experience in community agencies.

745, 746, 747, 748. Clinical Internship. (2 ea.)

Prerequisite: acceptance into clinical psychology program.

Full-time training at approved mental health agency.

799R. Doctoral Dissertation. (1-9)

Concluding research for doctoral program, culminating in final oral examination.

FACULTY

BALLIF-SPANVILL, BONNIE, *Professor*. PhD, Brigham Young University, 1966. Developmental Psychology.

BARLOW, SALLY H., *Professor*. PhD, University of Utah, 1978. Theory and Training in Individual and Group Therapy; Culture and Gender Diversity; Advanced Objective Assessment.

BEDNAR, RICHARD L., *Professor*. PhD, University of Minnesota, 1968. Theories of Group Work; Psychotherapy; Psychopathology.

BERGIN, ALLEN E., *Professor*. PhD, Stanford University, 1960. Psychology and Religion; Personality Theory; Psychotherapy Research.

BIGLER, ERIN D., *Professor*. PhD, Brigham Young University, 1974. Neuropsychology; Neuroanatomy; Neuroimaging.

BLOCH, GEORGE J., *Associate Professor*. PhD, Stanford University, 1968. Physiological Psychology; Neuroendocrinology.

BROWN, BRUCE L., *Professor*. PhD, McGill University, Canada, 1969. Psycholinguistics; Statistics and Research Methods.

BUNKER, GARY L., *Professor*. PhD, University of California, Berkeley, 1966. Prejudice and Intergroup Relations.

BURLINGAME, GARY M., *Professor*. PhD, University of Utah, 1983. Group Therapy; Research Design; Psychometrics.

CARPENTER, BRUCE N., *Associate Professor*. PhD, University of Wisconsin, Madison, 1980. Clinical Assessment; Psychopathology; Stress and Coping.

CLAYTON, CLAUDIA J., *Assistant Professor*. PhD, University of Utah, 1976; PhD, Brigham Young University, 1991. Biological Psychology; Treatment of Personality Disorders; Developmental Psychology.

ERVIN, GREGORY N., *Assistant Professor*. PhD, University of North Carolina, Chapel Hill, 1981. Psychobiology; Behavioral Pharmacology.

FLEMING, DONOVAN E., *Professor*. PhD, Washington State University, 1962. Cognitive Neuroscience; Comparative Psychology and Ethology; Sensory and Perceptual Processes; Vision and Visual Perception.

FUHRMAN, ADDIE, *Professor*. PhD, University of Minnesota, 1969. Individual and Group Psychotherapy; Group Therapy Processes and Outcomes.

GANTT, EDWIN E., *Assistant Professor*. PhD, Duquesne University, 1998. Theoretical and Philosophical Foundations of Psychology and Science; Hermeneutic-Phenomenological Approaches to the Psychological Study of Empathy and Altruism; Qualitative Research Methods.

HIGBEE, KENNETH L., *Professor*. PhD, Purdue University, 1970. Cognitive Psychology; Human Memory; Research Methodology.

JENSEN, LARRY C., *Professor*. PhD, Michigan State University, 1966. Moral Development; Parenting; Gender Issues.

LAMBERT, MICHAEL J., *Professor*. PhD, University of Utah, 1971. Research in Psychotherapy Process and Outcome.

MAUGHAN, MICHAEL L., *Associate Professor*. EdD, Utah State University, 1970. Psychotherapy, Adult Development; Biofeedback/Stress Management.

MILLER, HAROLD L., JR., *Professor*. PhD, Harvard University, 1975. Experimental Analysis of Learning and Motivation.

NORTON, ELIZABETH, *Assistant Professor*. PhD, Brigham Young University, 1978. Clinical Child Psychology; Pediatric Psychology.

ORME, G. CRAIG, *Assistant Professor*. PhD, Utah State University, 1980. Clinical Application; Behavioral Medicine/Health Psychology; Crisis Intervention.

PEDERSEN, DARHL M., *Professor*. PhD, University of Illinois, 1962. Quantitative Methods; Personality; Environmental and Sports Psychology.

RIDGE, ROBERT D., *Assistant Professor*. PhD, University of Minnesota, 1993. Interpersonal Behavior; Social Behavior; Attitudes.

ROBINSON, PAUL W., *Professor*. PhD, Utah State University, 1973. Behavior Modification; Analytical Methodology; Parenting.

SLIFE, BRENT, *Professor*. PhD, Purdue University, 1981. Theoretical/Philosophical; Theoretical Underpinnings of Personality and Psychotherapy; Systems Approaches to Therapy.

SMITH, KAY H., *Professor*. PhD, Wayne State University, 1962. Group Dynamics; Attitude Measurement; Evaluation of Organizational Programs.

SORENSEN, DAVID M., *Professor*. EdD, Harvard University, 1970. Psychodiagnostics; Human Development.

SPACKMAN, MATTHEW P., *Assistant Professor*. PhD, Georgetown University, 1998. Philosophical and Historical Approaches to Emotion, Social Functions of Emotions; Attribution of Responsibility for Emotions; Quantitative and Experimental Methods.

SPANGLER, DIANE, *Assistant Professor*. PhD, University of Oregon, 1994. Depression; Cognitive Theory and Therapy; Eating Disorders.

STIMPSON, DAVID V., *Professor*. PhD, University of California, Berkeley, 1964. Attitude Formation and Change; Entrepreneurship; Leadership and Management.

WEIGHT, DAVID G., *Professor*. PhD, University of Washington, 1969. Psychopathology; Assessment; Neuropsychology.

WELLS, M. GAWAIN, *Associate Professor*. PhD, Purdue University, 1972. Psychotherapy; Clinical Child Psychology; Child and Adolescent Assessment.

WILLIAMS, RICHARD N., *Professor*. PhD, Purdue University, 1981. Theoretical and Philosophical Foundations of Psychology.

WOOD, LARRY E., *Professor*. PhD, University of Iowa, 1971. Cognitive Psychology; Applications of Artificial Intelligence; Human-Computer Interaction.

GEORGE W. ROMNEY INSTITUTE OF PUBLIC MANAGEMENT

Director: Lawrence C. Walters

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THE PROGRAM OF STUDIES

Administered through the Romney Institute of Public Management, the Master of Public Administration (MPA) Program prepares men and women for leadership in the public and not-for-profit sectors. Leadership in this context provides unique opportunities for service to others. The faculty and students of the MPA Program are dedicated to the philosophy that students should develop excellence in both knowledge and management skills, based on a solid ethical foundation. The success of this philosophy is demonstrated by the wide variety of leadership positions now held by alumni throughout the world. Graduates hold leadership positions in state and local governments, federal agencies, research organizations, business firms, and a variety of nonprofit organizations. They are city managers, personnel directors, policy analysts, and finance directors.

Today the public sector is called on to assist in areas that were traditionally the sole domain of profit organizations. Never before has there been a greater need for professionally trained public managers, and never before has there been greater opportunity for dedicated and qualified public managers to provide leadership in shaping the course of human affairs through public institutions and programs.

The Romney Institute offers two programs leading to the MPA degree: the preservice and the in-service or executive program. Both are

accredited by the National Association of Schools of Public Affairs and Administration (NASPAA). The preservice program is a two-year, full-time program; approximately thirty-five to forty students are admitted each year. The executive, or in-service program, is normally a three-year program taught one night a week; approximately forty students are admitted to the Executive MPA Program each year. There is also a joint degree, the MPA/JD degree. Admission to the joint program is contingent upon acceptance into both programs.

Public Administration—MPA

The preservice MPA Program is designed to provide an understanding of the essential body of knowledge and to develop the basic skills needed for professional management. Such essentials include quantitative analysis, managerial economics, management philosophy and strategy, human resource management, accounting, budget and finance, ethics, and communication. These skills are taught through practical class and field experiences, case studies, formal and computer simulations, and special workshops and seminars. Second-year courses are designed around an individual's desired area of concentration. Such areas include: Local Government Management, Human Resource Management, Financial Management, and Public Policy Analysis. Emphasis in each of these concentrations is given to the conceptualization of the larger political and social issues as they relate to the administration of government programs.

Admission and Entry.

- Semesters of entry and application deadlines: fall, March 1 for the preservice program and May 1 for the executive program.
- Application requirements: minimum 3.0 GPA on a 4.0 scale for last 60 hours and a general career interest in public management as reflected in a statement of intent.

- Entrance examination: GRE or GMAT (average 1997–98 GMAT score was 550).

Requirements for Degree.

- Credit hours: minimum 64 course work hours.
- Required courses:
Public Administration Environment: PMgt 610, 611, 682, 684.
Human Resource Management: PMgt 640, 643.
Financial Resource Management: PMgt 622, 628.
Decision Making and Analysis: PMgt 603, 630, 632, 685, 686, 693R (Field Project).
Communication: PMgt 660, 661.
- Required concentration courses: one of these five areas of concentration must be chosen by the beginning of the second year:
City Management: PMgt 615, 671, 675, 676.
Human Resource Management: PMgt 641, 644, 645, 647, 649R (OSHA).
Financial Management: PMgt 624, 625, 629R; 645 or 671.
Policy Analysis: PMgt 615, 624, 689R (Policy Analysis Theory); 645 or 671.
Information Systems: PMgt 635; 645 or 671.
- Electives: determined in consultation with faculty advisor. Some classes may be taken in other graduate departments.

The preceding does not represent the full range of requirements and opportunities in the program. See the Marriott School Graduate Catalog for greater details.

Executive Program—MPA

Persons with significant public management experience who desire to pursue the master's degree program while continuing to work full-time are encouraged to apply. All courses in the program are offered in the evenings.

The Executive MPA Program consists of successful completion of at least 44 semester hours of approved course work. Classes are scheduled in such a way so that students will normally be able to take up to 6 hours per semester. On this sched-

ule, students can complete the degree in eight semesters.

Admission and Entry.

- Semesters of entry and application deadlines: see preservice MPA Program.
- Application requirements: see preservice MPA Program. (**Note:** entrance exam not required.)
- Prerequisite: applicants are required to have a minimum four years of full-time professional, administrative, or supervisory experience in the public sector, or the equivalent. Applicants must presently hold, or assume in the near future, a midlevel or higher administrative responsibility.

Requirements for Degree.

- Credit hours: minimum 44 course work hours.
- Required courses:
Public Administration Environment: PMgt 610, 682, 684.
Human Resource Management: PMgt 640, 643, 645.
Financial Resource Management: PMgt 622, 628.
Decision Making and Analysis: PMgt 603, 630, 632, 685, 686.
Communication: PMgt 660.
- Electives (6 credit hours): determined in consultation with faculty advisor.

Joint Program—MPA/JD

Because of the unique advantages of a joint degree in law and public administration, the Romney Institute of Public Management and the J. Reuben Clark Law School have approved a four-year joint degree program. This is possible because of the overlapping interests and direction of the two individual programs.

FINANCIAL ASSISTANCE

The Romney Institute of Public Management utilizes the Marriott School's financial aid provisions. Qualified students can receive aid from the following: the Marriott School Scholarship Fund, private scholarship donations, assistantship awards, and loan assistance.

Scholarships. The Marriott School currently has over sixty-five private scholarships. Information and applications are available for second-year students in 730 TNRB (deadline: March 31). In addition, the MPA program has scholarship funds that include two private scholarships:

- The LeRoy and Agda Harlow City Management Scholarship.
- The Gale Wilson and City Management Friends of BYU Scholarship.

Assistantships. Research and teaching assistantships are available for qualified second-year students.

Loans. Several loans are available for Marriott School students:

- Marriott School loans: available to full-time Marriott School day students. Marriott School loans are handled on an individual basis, dependent on financial need and standing within the participating program.
- BYU short-term loans: available for up to the cost of tuition only.
- Federal Stafford loans: subsidized by the U.S. government. Not available for international students.

More information on and applications for these loans are available from the BYU Financial Aid Office, A-41 ASB, (801) 378-4104.

RESOURCES AND OPPORTUNITIES

The N. Eldon Tanner Building. The Tanner Building, which houses the Marriott School, is one of the finest facilities of its kind. Surrounding the dramatic eight-story atrium at its center are lecture and seminar rooms, study rooms, a computer laboratory, and a working library.

The Marriott School. The Marriott School is recognized as one of the outstanding management schools in the nation. Faculty are actively engaged in research and publication, and they fill leadership positions in a number of national professional organizations. The school has developed innovative educational programs that include internships, execu-

utive visitation programs, special student consulting and research projects, and other activities designed to bring management education and training closer to management practice. This is accomplished, in part, through the Marriott School's National Advisory Council and the Executives on Campus Program.

The National Advisory Council. Consisting of sixty-five to seventy prominent business and government executives, the National Advisory Council lends major support to the Marriott School. Students benefit by interacting with council members in special campus lectures and seminars and by visiting or working with these executives in their respective organizations. Furthermore, the council assists students with placement opportunities, helps develop funding sources for scholarships, and provides professional development for faculty members.

The Executives on Campus Program. This program gives students an opportunity to interact with distinguished business and government leaders who come to campus. These executives visit classes and meet with student organizations as well as participate in the Executive Lecture Series and Entrepreneurship Lecture Series.

COURSE DESCRIPTIONS

603. Managerial Accounting and Computer Concepts. (1-4)

Accounting systems and processes emphasizing use of management control, financial analysis, decision making, performance evaluation. Spreadsheets and database management.

607. Program Evaluation. (3)

Basic principles, methods, and standards for financial and performance evaluation.

610. Managerial Economics. (1-3)

Utilizing economic concepts in the public sector, including an analysis of exchange, specialization, costs, markets for goods and services, and market failure.

611. Economic Environment of Public Administration. (2)

Introduction to international and national economic issues and their effect on the public administrator.

615. Urban and Regional Economics. (2-3)

Economic analysis of market forces in development of cities, firm location decisions, urban economic development, and urban land-use patterns.

619R. Seminar in Economic Analysis. (1-3)

Advanced study in economics with variation in topics to meet current needs.

622. Budget and Finance. (3-4)

Acquisition and management of financial resources. Organization and responsibility for revenue sources, budget allocation, control, and planning.

624. Advanced Analysis and Budgeting. (3)

Program evaluation techniques, performance measurement, and optimization processes. Linear programming, DEA, and other analytic techniques.

625. Debt Management. (3)

Advanced study of capital markets, debt instruments, bond issues, debt servicing, and financial disclosure requirements.

626. Tax Policy and Management. (3)

Seminar examining tax structure, impact, management, and other selected issues.

628. Managing Public Financial Resources. (2-3)

Managerial cost analysis for cost control, performance evaluation, and investment of public funds; management of funds' flow and cash flow in public-sector organizations.

629R. Seminar in Financial Management. (2-3)

Advanced study in public-sector financial management and analysis, with variation of topics to address emerging issues and meet current needs.

630. Statistical Analysis. (3)

Use of statistical techniques for decision making, emphasizing measurement, descriptive statistics, hypothesis testing, and regression.

632. Quantitative Analysis. (1-3)

Introduction to procedures commonly used in analyzing public programs and problems.

635. Systems Analysis and Design. (2-3)

Applying systems analysis and design to the management of public information.

640. Human Resource Management. (2-3)

Current theory and practice of human resource planning, job analysis, position classification, compensation, benefits, and labor relations.

641. Management and Organization Development. (2-3)

Current theory and practice for training programs in development of human resources, managers, and organizations.

642R. Management Development Seminar. (1-3)

Workshops and seminars designed for personal growth development and assessment of decision-making skills.

643. Management Philosophy and Style. (3)

Experience-based class to help assess leadership style and develop a philosophy of management and an understanding of organization behavior.

644. Compensation and Benefits. (3)

Systems and procedures for determining and administering pay and employee benefits.

645. Human Resource Law. (1-3)

Introduction to human resource law.

646. Total Quality Management in Government. (3)

Applying theory, tools, and team management of TQM in the public sector.

647. Human Resource Staffing. (3)

Staffing needs, planning, recruiting, and hiring.

649R. Seminar in Human Resource Management. (1-3)

Advanced study in human resource management with variation in topics to meet current needs.

650. Public and Nonprofit Marketing. (3)

Role and application of marketing management in activities of government agencies and nonprofit institutions, emphasizing marketing research, analysis, and strategy.

659R. Seminar in International Management. (1-3)

Examination of international administration, with variation in topics to meet current needs, including comparative administration, technical assistance, and cultural restraints.

660. Written Communication. (1-2)

Development of written communication skills. Writing effective reports, memoranda, and other management documents.

661. Oral Communication. (1)

Developing oral communication skills.

671. Local Government Law. (1-3)

Introduction to contracts, torts, land use, and zoning.

675. Urban Management. (3)

Administrative organization, municipal functions, communications, regulatory procedures, and intergovernmental relations.

676. Urban and Regional Planning. (3)

Basic principles of planning for urban government. Environmental impact statements, specific plans, and implementation procedures in urban planning.

679R. Seminar in Local Government Administration. (1-3)

Advanced study in local government administration with variation in topics to meet current needs.

682. Ethics for Management. (3)

Forces operating on the manager and the ethical considerations of leadership in a democratic, pluralistic society.

684. Environment and Process of Public Administration. (3)

Governmental, legal, political, and social environment of public administration.

685. Management Strategy. (3)

Developing mission and goals, analyzing environment, and assessing and developing organization capacity.

686R. Current Issues in Public Management. (2-3)

Integrating public management training with a focus on current issues confronting public managers.

688. Business-Government Relations. (3)

Interaction between business and government organizations, including the influence of business leaders on public policy and the regulation of business by government organizations.

689R. Topics in Public Policy Analysis. (1-3)

Examining forces and events in the formulation of public policy. Concepts for analyzing public policy.

691R. Readings and Conference. (1-3)

Prerequisite: departmental consent.

Individualized readings and consultations.

692R. Directed Research. (1-3)

Prerequisite: departmental consent.

Application of research methods relative to managers.

693R. Practicum. (1-4)

Prerequisite: departmental consent.

Planned application of administrative concepts in a management work situation and analysis of the impact.

FACULTY

- ADOLPHSON, DONALD L.**, *Professor*. PhD, University of Wisconsin, Madison, 1973. Policy Analysis.
- BRADY, F. NEIL**, *Professor*. PhD, University of Texas, Austin, 1978. Ethics; Organizational Theory.
- BUCKWALTER, DOYLE W.**, *Associate Professor*. PhD, University of Michigan, 1968. Urban Management; Public Policy.
- CORNIA, GARY C.**, *Professor*. PhD, Ohio State University, 1979. Public Finance; Budgeting.
- HART, DAVID KIRKWOOD**, *Professor*. PhD, Claremont Graduate School, 1965. Ethics; Organization Theory.
- KNIGHTON, LENNIS M.**, *Professor*. PhD, Michigan State University, 1966. Accounting; Finance; Performance Evaluation.
- KOLLER, ROLAND H., II**, *Associate Professor*. PhD, University of Wisconsin, Madison, 1969. Economics; Industrial Organization.
- PARSONS, ROBERT J.**, *Professor*. PhD, University of California, Riverside, 1971. Economics; Strategic Planning.
- PRITCHETT, B. MICHAEL**, *Professor*. PhD, Purdue University, 1970. Econometrics; Public Finance.
- RITCHIE, J. BONNER**, *Professor*. PhD, University of California, Berkeley, 1968. Organizational Philosophy and Theory.
- THOMPSON, MICHAEL P.**, *Associate Professor*. PhD, Rensselaer Polytechnic Institute, 1985. Communication.
- WALTERS, LAWRENCE C.**, *Associate Professor*. PhD, University of Pennsylvania, 1987. Quantitative Methods; Policy Analysis.
- WHEELER, GLORIA E.**, *Associate Professor*. PhD, University of Michigan, 1972. Quantitative Analysis; Human Resource Management.
- WOLLER, GARY M.**, *Associate Professor*. PhD, University of Rochester, 1992. Policy Analysis; Political Economy.
- WRIGHT, N. DALE**, *Professor*. PhD, University of Southern California, 1972. Organizational Behavior; Theory; Management Strategy.

PUBLIC POLICY

Graduate Coordinator: Gary Bryner

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Provo, UT 84602-5516
(801) 378-7146
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THE PROGRAM OF STUDIES

The interdisciplinary MA degree in public policy analysis seeks to equip students with the skills required to evaluate laws, regulations, programs, and other efforts of governments. Public policy is not simply the aggregation of demands individuals and groups make on governments. It is ultimately concerned with ideas of justice and fairness and other values that are at the heart of democratic government, with expectations of economic efficiency, and with societal choices concerning the allocation of resources and distribution of benefit and burdens.

The study of public policy analysis involves and draws on, in general, several core disciplines, particularly economics, political science, and public management, in assessing policy choices. Analyses of specific policies may borrow from a number of relevant disciplines, such as biology, education, engineering, family sciences, geography, sociology, and social work.

Among the kinds of questions public policy students study are: What are governments doing to address social, economic, and natural resource problems, and how successful are they? What principles can guide government officials in intervening in the lives of families and individuals? How can the effectiveness of policies be compared and evaluated?

Graduates who have an understanding of the political process, how government works, and the nature of specific public policies are in a strong position to play a major role in helping these organizations deal with the public policies affecting them. Studying public policy may

also help prepare students for further study in economics, law, political science, public administration, and related fields.

One degree is offered in this interdisciplinary program: Public Policy—MA.

Public Policy—MA

The public policy master's program prepares students for careers as policy analysts in all levels of government and in other organizations that seek to study and affect public policy. Although most of the opportunities are in state and local government agencies, students may also pursue careers with the federal government and with international organizations.

The combination of general political and analytic skills with preparation in a specific policy area gives students a strong background for a wide variety of positions. Some students may choose careers that are specialized and focus on particular areas of policy, such as social welfare, education, environmental protection, natural resource preservation, housing, or health care, or they may choose more general or politically oriented careers. The study of public policy also prepares students for work in the private sector and nonprofit organizations and other areas that interact with government.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international). Applicants should complete all parts of the application form required by the university, with appropriate fees and transcripts, and indicate the department/program as public policy.
- Entrance examination: GRE is recommended.
- Prerequisite: baccalaureate degree, any field. Several of the required courses in the program have as a prerequisite calculus (Math 112). Applicants are also encouraged to complete the following courses before entering the program: Econ 110, PISc 110, and Engl 315.

Requirements for Degree.

- Credit hours: 60.
- Required courses: first year: PPol 501, 502, 503, 504, 505, 599R; Econ 380, 382, 475; two electives. Second year: PPol 511, 512, 513, 514, 515; four electives.
- All classes are listed as public policy (PPol) courses—except the economics courses—and offer 3 credit hours. Students take the same core courses. During the first year substantive policy elective courses are taken from the relevant departments. During the second year students take the substantive policy courses expressly created for policy students and integrated with the core curriculum.

Substantive policy courses are offered in education, family, health and aging, and natural resource policy. Students select one major and one minor substantive policy area and should structure their policy electives as follows: three courses in the major substantive area, two courses in a second or minor substantive area or in analytic methods, and one course in any substantive area or method.

FINANCIAL ASSISTANCE

The financial aid application deadline is February 1. Financial aid available includes graduate student assistantships, i.e., paid positions requiring ten hours of work per week on research projects with faculty members.

COURSE DESCRIPTIONS**501. Introduction to Policy Analysis. (3)**

Models of policy analysis; defining policy; problems and policy analysis questions.

502. Policy Process. (3)

Models of public policy making; interaction of politics and policy making.

503. Data Analysis 1. (3)

Introduction to descriptive and inferential statistics.

504. Data Analysis 2. (3)

Prerequisite: PPol 503.

Quantitative data collection and analysis.

505. Normative Theories of Policy Analysis. (3)

Alternative norms and values used in making policy choices.

511. Policy Analysis 1. (3)

Introduction to applied cost benefit analysis and methods of measuring economic values.

512. Policy Analysis 2. (3)

Prerequisite: PPol 511.

Advanced techniques of policy analysis.

513. Field Experience. (3)

Design and implementation of a policy analysis project.

514. Policy Analysis Workshop. (3)

Policy analysis projects in varying formats.

515. Graduate Seminar. (3)

Prerequisite: PPol 513.

Continuation of field experience project; preparation and presentation of final report.

599R. Academic Internship. (1-9)

Prerequisite: PPol 501, 502, 503, 504, 505; Econ 380, 382, 475, or equivalents.

Internship with an organization conducting policy analysis.

FACULTY**Public Policy Advisory Committee:**

Gary Bryner
J. R. Kearl
E. Vance Randall
Lawrence C. Walters
Sven E. Wilson

Current faculty teaching public policy-related courses include the following:

BRADFORD, SCOTT C., *Assistant Professor*. PhD, Harvard

University, 1998. Economics.

BRYNER, GARY, *Professor*. PhD, Cornell University, 1982. Political Science.

CORNIA, GARY C., *Professor*. PhD, Ohio State University, 1979. Public Management.

GOODLIFFE, JAY M., *Assistant Professor*. PhD, University of Rochester, 1998. Political Science.

HITE, STEVEN J., *Associate Professor*. EdD, Harvard University, 1985. Educational Leadership and Foundations.

KEARL, J. R., *Professor*. PhD, Massachusetts Institute of Technology, 1975. Economics.

POPE, CLAYNE L., *Professor*. PhD, University of Chicago, 1972. Economics.

RANDALL, E. VANCE, *Associate Professor*. PhD, Cornell University, 1989. Educational Leadership and Foundations.

SHOWALTER, MARK H., *Associate Professor*. PhD, Massachusetts Institute of Technology, 1991. Economics.

THOMSON, DENNIS L., *Professor*. PhD, University of California, Santa Barbara, 1969. Political Science.

WALTERS, LAWRENCE C., *Associate Professor*. PhD, University of Pennsylvania, 1987. Public Management.

WILSON, SVEN E., *Assistant Professor*. PhD, University of Chicago, 1997. Political Science.

WOLLER, GARY M., *Assistant Professor*. PhD, University of Rochester, 1992. Public Management.

RECREATION MANAGEMENT AND YOUTH LEADERSHIP

Chair: Thomas S. Catherall
Graduate Coordinator: Mark
Widmer

273-E RB
Provo, UT 84602-2030
(801) 378-3381

THE PROGRAM OF STUDIES

The Department of Recreation Management and Youth Leadership offers one degree: Youth and Family Recreation—MS. The curriculum includes two specializations: Youth Development (character, citizenship, career, leadership development, youth at risk, and other youth agency issues) and Family Recreation (issues of the family as it relates to leisure philosophy, theory, development, participation, and programs).

Each spring the department accepts four or five new students, who begin their studies the following September. The average student graduates after two years of course work and completing a thesis.

Youth and Family Recreation—MS

All students will complete a thesis in one of the MS degree's two specializations: Youth Development and Family Recreation.

Admission and Entry.

- Semester of entry and application deadline: fall, February 1 (U.S. and international).
- Entrance examination: GRE general test.
- GPA: minimum 3.0 for last 60 semester hours of undergraduate work.
- Prerequisite: undergraduate major or minor in recreation or youth leadership. Applicants with other backgrounds may be admitted provisionally but must complete 6–9

credits of selected prerequisite classes.

Requirements for Degree.

- Credit hours (33): 27 course work hours, plus 6 thesis hours (RMYL 699R).
- Required courses:
Youth Development: FamSc 563, FamSc-Soc 600, 660, RMYL 602, 603, 604, 699R; Stat 510, 511, or 511, 512; and 3 hours of electives.
Family Recreation: FamSc 563, 564, FamSc-Soc 600, RMYL 601, 603, 604, 699R; Stat 510, 511, or 511, 512; and 3 hours of electives.
- Minor (optional): any approved minor.
- Thesis.
- Examinations: comprehensive written examination, oral defense of thesis.

FINANCIAL ASSISTANCE

Graduate awards are available in the form of assistantships and scholarships. Occasionally some graduate faculty members are awarded research grants that may include opportunities for paid research assistantships for department graduate students.

RESOURCES AND OPPORTUNITIES

Learning Resource Center. This center contains eighteen individual study areas for graduate students as well as computer, audio, and video equipment to assist them in their work.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

599R. Academic Internship. (1–8)
Prerequisite: instructor's consent.
Professional leadership practicum.

601. Theoretical Foundations of Family Recreation. (3)

Prerequisite: formal acceptance into recreation management graduate program.

Historical development, theoretical basis, and applied techniques of family recreation.

602. Developmental Youth Programs. (3)

Prerequisite: formal acceptance into recreation management graduate program.

Historical and theoretical roots of developmental youth programs that stress preventative approaches. How to develop character, citizenship, moral and physical fitness, volunteerism; service learning.

603. Readings in Youth and Family Recreation. (3)

Prerequisite: formal acceptance into recreation management graduate program.

Readings from professional literature and current publications.

604. Seminar on Youth and Family Recreation. (3)

Prerequisite: formal acceptance into recreation management graduate program.

Intensive investigation and discussion of current issues, problems, and trends in family recreation and youth programs.

699R. Master's Thesis. (1–9)

FACULTY

- CATHERALL, THOMAS S.,** *Professor.* EdD, Brigham Young University, 1980. Youth Research; Education and Play.
- FERGUSON, DANIEL D.,** *Associate Professor.* PhD, University of Oregon, 1980. Therapeutic Recreation; Gerontology; Computer Applications.
- GRAY, HOWARD R.,** *Professor.* PhD, Pennsylvania State University, 1977. Therapy; Gerontology.
- NAYLOR, JAY H.,** *Professor.* EdD, University of Utah, 1973. Administration.

NELSON, DOUGLAS C., *Associate Professor*. PhD, University of New Mexico, 1995. Youth Research; Outdoor Recreation

OLSEN, BURTON K., *Professor*. PhD, University of Minnesota, Minneapolis, 1970. Research.

PHELAN, C. MICHAEL, *Assistant Professor*. PhD, University of Illinois, Urbana-Champaign, 1992. Leisure Studies; Management.

WIDMER, MARK A., *Assistant Professor*. PhD, University of Utah, 1993. Therapeutic Recreation; Assessment; Adolescence.

RELIGIOUS EDUCATION

Chair—Ancient Scripture: Andrew C. Skinner

375-A JSB
Provo, UT 84602-5689
(801) 378-2067

Chair—Church History and Doctrine: Raymond S. Wright

375-B JSB
Provo, UT 84602-5690
(801) 378-3691

THE PROGRAM OF STUDIES

Religious Education has two departments: the Department of Ancient Scripture and the Department of Church History and Doctrine. Both departments offer graduate minors but not graduate majors.

Ancient Scripture—Minor

Requirements for Degree.

- Credit hours:
Master's Level: minimum 9 approved hours, no more than 2 hours of which may be readings courses.
Doctoral Level: minimum 12 hours determined in consultation with major department chair.
- Required courses: determined with approval of Ancient Scripture Department chair. Courses in biblical languages such as Heb 331 and 531 or Greek 411, 612, and 613 that could strengthen a graduate minor in ancient scripture would be in addition to minimum hours required in religion.
- Advisory committee: must include one member from Ancient Scripture Department faculty.
- Credit limitation: no undergraduate credit may apply.

Church History and Doctrine—Minor

Requirements for Degree.

- Credit hours:
Master's Level: minimum 9 approved hours.

Doctoral Level: minimum 12 hours determined in consultation with major department chair.

- Required courses: determined with approval of Church History and Doctrine Department chair.
- Graduate committee: must include one member from Church History and Doctrine Department faculty.
- Credit limitation: no undergraduate credit may apply.

RESOURCES AND OPPORTUNITIES

Religious Studies Center. The dean of Religious Education is also the general director of the Religious Studies Center, which promotes research in ancient studies, the Bible, the Book of Mormon, LDS Church history, the Doctrine and Covenants, the Pearl of Great Price, and world religions.

The center is a supporting and coordinating agency for religion-oriented research throughout the university. Concentrating on research, writing, and other scholarly activities, it is not involved in classroom instruction or degree programs.

The Richard L. Evans Chair of Religious Understanding. The occupants of the Richard L. Evans Chair of Religious Understanding promote understanding among people of different faiths through teaching and other activities. The chair was established to articulate to a broad audience the religious values to which Elder Evans dedicated his life and to promote an enlightening exchange among Latter-day Saints, members of other faiths, and people of good will everywhere.

COURSE DESCRIPTIONS

Ancient Scripture

501. Analysis of the Old Testament: The Pentateuch and Historical Books. (3)

502. Analysis of the Old Testament: Prophetic Books. (2)

503. Analysis of the Old Testament: Poetic and Wisdom Literature. (2)

510R. Special Topics in Ancient Scripture. (1–3)

Prerequisite: LDS Church Seminaries and Institutes personnel only.

Subjects and questions typically addressed by Church Educational System instructors. No more than 3 hours may apply toward a graduate degree.

511. The Gospels. (2)

512. Paul's Life and Letters. (2)

513. The General Epistles and Revelation. (2)

514. Historical Background of the Bible. (2)

Historical and cultural contexts out of which the Old and New Testaments derive.

521, 522. Analysis of the Book of Mormon. (3 ea.)

523. External Evidence of the Book of Mormon. (2)

527. History and Doctrines of the Pearl of Great Price. (3)

606. The Apocrypha and Pseudepigrapha. (2)

610R. Graduate Seminar in Ancient Scripture (1–3)

620R. Directed Readings in Ancient Scripture. (1–3)

Church History and Doctrine

510R. Special Topics in Church History and Doctrine.(1–3)

Prerequisite: LDS Church Seminaries and Institutes personnel only.

Subjects and questions typically addressed by Church Educational System instructors. No more than 3 hours may apply toward a graduate degree.

524, 525. Analysis of the Doctrine and Covenants. (3 ea.)

530. LDS Doctrine. (2)

540R. Special Topics in Church History and Doctrine. (2–3)

Independent Study available to commissioned and prospective chaplains only.

Topics include Joseph Smith's thought, Church doctrine, schismatic movements in Church history, historical setting of the Restoration, comparative American religions, Near Eastern religions, etc.

541. Documents of LDS Church History (1805–1844). (3)

542. Documents of LDS Church History (1844–1900). (3)

543. Documents of LDS Church History (Twentieth Century). (3)

551. History of the Early Church Through the Fourth Century. (3)

552. Medieval and Reformation Christianity. (3)

553. History of Christianity Since the Seventeenth Century. (3)

555. Monotheistic Religions of the World. (2)

Considers Zoroastrianism, Judaism, Christianity, Islam, Sikhism.

556. South and East Asian Religions. (2)

Considers Hinduism, Jainism, Buddhism, Confucianism, Taoism, Shintoism.

640R. Graduate Seminar in Church History and Doctrine. (1–3)

Topics include the Doctrine and Covenants, LDS church history, LDS doctrine, Christian history, Christian theology, world religions, etc.

650R. Directed Readings in Church History and Doctrine. (1–3)

Prerequisite: graduate standing and instructor's consent.

Topics include the Doctrine and Covenants, LDS Church history, LDS doctrine, Christian history, Christian theology, world religions, etc.

FACULTY

For faculty listings, refer to the BYU Undergraduate Catalog.

SCHOOL OF SOCIAL WORK

Director: Kyle L. Pehrson

Associate Director: Wanda M. Spaid

Graduate Coordinator: Michael M.

O. Seipel

Fieldwork Director: W. Eugene Gibbons

221 KMB

Provo, UT 84602-4472

(801) 378-3282

THE PROGRAM OF STUDIES

Accredited by the Council on Social Work Education.

The School of Social Work is committed to the general objective of the social work profession, which is to promote the general welfare of society by enhancing the social functioning of individuals, families, groups, organizations, and communities. The goal of the MSW program is to prepare students for the practice of clinical social work, with an emphasis on work with the family and children. The School of Social Work offers a core curriculum in the basic knowledge, skills, and values essential to all social work practice.

One graduate degree is offered in the School of Social Work: Social Work—MSW.

Approximately forty students are admitted to the MSW program each fall semester. Candidates usually pursue the degree over a contiguous twenty-month period, which includes 1,100 clock hours of field practicum.

Social Work—MSW

The curriculum is designed around a psychosocial approach to practice within an integrating framework of systems theory. This approach will allow the practitioner to be responsive to the special issues of diversity in a pluralistic society.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Entrance examination: at school's discretion.
- Prerequisite: applicants are expected to have prepared themselves for the MSW program by completing course work and developing a base of knowledge and skill in the following areas: (a) research*, statistics* (5 hours); (b) human biology* (3 hours); (c) behavioral sciences (3 hours), abnormal behavior*; (d) social sciences (3 hours), i.e., social psychology, sociological theory, social organization, political science, etc.; (e) introduction to social work course.*

*Specifically required.

Requirements for Degree.

- Credit hours for students entering without an undergraduate social work degree: minimum 64 course work hours distributed as follows: social work practice courses (18 hours); human behavior and social environment (9 hours); social welfare policy (6 hours); research (6 hours); professional seminar (3 hours); field practicum (14 hours); electives (8 hours).
- Electives: minimum of 8 hours, 6 of which are clinical. One of the elective classes may be selected from a variety of clinical/family courses outside the school or from other educational opportunities to be negotiated with the faculty advisor.
- Optional research project (SocW 698R).
- Students who enter with an undergraduate social work degree will complete 59 total credit hours (instead of 64). Credit is given for 11 hours. Six of those 11 hours must be substituted with other electives.

FINANCIAL ASSISTANCE

Financial assistance is available through university funds. Research and teaching assistantships as well as field internships are available

through the School of Social Work. Some scholarships are also available.

RESOURCES AND OPPORTUNITIES

The School of Social Work utilizes the Comprehensive Clinic, an interdisciplinary training and research facility. The facility houses state-of-the-art video and computer equipment, as well as a staff of skilled technicians and secretaries to support graduate student and faculty research. Faculty and student research is also facilitated through the school's Social Work Research Center. In addition, graduate students access the Family and Demographic Research Institute and the Women's Research Institute. Students who plan on further graduate work are encouraged to conduct individual research or work with a faculty member.

Faculty research interests currently include: poverty; gerontology; family violence; mental health; military social work; health care; women and gender; school social work; family preservation.

For a more detailed description of the graduate program requirements, send for a copy of the school's bulletin.

COURSE DESCRIPTIONS**550 Crisis Intervention. (3)**

Assessment and intervention in crisis situations with clients.

560. Substance Abuse and Addiction. (2)

Historical/social overview of use of substances in America and associated problems; overview of each of major drug types; specific issues associated with use; effects on minorities, women, children.

567. Social Services for the Aging. (2)

Prerequisite: instructor's consent.

Process and impact of social service delivery systems on the aged.

595R. Directed Readings. (1-3)

Prerequisite: instructor's consent.

600. Social Work Research. (3)

Overview and application of qualitative and quantitative social work research and statistical analysis. Issues of research ethics and oppressed populations. For majors only.

601. Practice Evaluation. (3)

Prerequisite: SocW 600.

Methods of social work program and practice evaluation, including a focus on clinical measures for monitoring client progress and outcomes. For majors only.

612. Human Behavior and Social Environment 2: Psychopathology. (3)

Prerequisite: Psych 342 or equivalent; SocW 620.

Etiology and symptoms of dysfunctional behavior and their effects on the individual, family, and community. Majors only.

620. Human Behavior and Social Environment 1: Life Span. (4)

Development of humans across the life span as individuals and members of families, other groups, organizations, and communities. Cultural, social, psychological, biological, spiritual, and physical forces.

623. Cultural Diversity Seminar. (1)

Social, cultural, ethnic, and racial experiences, needs, and beliefs of diverse persons.

630. Social Welfare Policy 1: A Framework for Analysis, Goal Setting, and Change. (3)

Analyzing and changing social policies and programs. For majors only.

631. Social Welfare Policy 2: Social Work and Family Law. (3)

Prerequisite: SocW 630.

The law relative to formation, functioning, and dissolution of families and delivery of social services to them. For majors only.

638. Practice in Child Services. (2)

Prerequisite: instructor's consent.

Working with the social service delivery system on problems related to child neglect and abuse, foster care, adoptions, etc.

641. Interventive Methods with Children and Adolescents. (2)

Use of interventive methods in treating child and adolescent problems in addition to understanding reciprocal impact of significant systems, i.e., school, family, peers, church, health.

642. Human Behavior and Social Environment 3: Marriage and Family Theories and Treatment. (2)

Prerequisite: instructor's consent.

Various models of marriage and family treatment; appropriate intervention skills. For majors only.

643. Advanced Marriage and Family Practice. (2)

Prerequisite: SocW 642.

Advanced methods of intervention with marital dyads, family, and community. For majors only.

644. Intervention with Clients of Diversity. (3)

Prerequisite: instructor's consent.

Applying core clinical practice skills to distinct groups representing racial, ethnic, and cultural diversity.

645. Theological Perspectives on Social Work Practice. (2)

Prerequisite: instructor's consent.

Interface of religious and social work values, attitudes, and principles.

646. Gender Issues in Social Work Practice. (2)

Prerequisite: instructor's consent.

Social work practice and specific problems and issues associated with both genders but focusing on changing expectations and roles of women.

647R. Special Topics in Advanced Clinical Practice. (2)

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Object Relations Therapy
- Cognitive Therapy
- Understanding the Professional Self and the Therapeutic Alliance
- Play Therapy
- Family Preservation
- Models of Family Therapy
- Human Sexuality and Social Work Practice

648R. Selected Fields of Practice. (2)

Prerequisite: instructor's consent.

Current problems and treatments in social work practice, such as family violence, addiction, and human sexuality.

654R. Field Practicum. (1-3)

Prerequisite: first-year placement.

Practicum in social service agencies with an integrative seminar to examine relationship between theory and practice. For majors only.

655R. Field Practicum. (1-3)

Prerequisite: second-year placement.

Practicum in social service agencies with an integrative seminar to examine relationship between theory and practice. For majors only.

660. Social Work Practice: Casework. (2)

Prerequisite: SocW 620 or concurrent registration.

Psychosocial assessment of individuals and implementing interventions. Skills laboratory required. For majors only.

661. Social Work Practice: Advanced Casework. (3)

Prerequisite: SocW 660.

Building on skills acquired in SocW 660; using different microintervention models and approaches. For majors only.

662. Social Work Practice: Group Work. (2)

Prerequisite: SocW 620 or concurrent registration.

Structure, function, dynamics, and development of small groups, emphasizing group models and group theory. For majors only.

663. Social Work Practice: Advanced Group Work. (1)

Prerequisite: SocW 662.

Applying group theory to individual and family problems. Role of social workers in group process. Group leadership experience required. For majors only.

664. Social Work Practice: Community Organization. (2)

Prerequisite: SocW 621 or concurrent registration.

Basic practice theory, tactics, and strategies in working with neighborhoods, communities, and organizations toward planned change. For majors only.

665. Social Work Practice: Introduction to Human Services Administration. (2)

Key managerial functions of complex organizations and institutions; administrative theory and selected management techniques. For majors only.

666. Social Work Practice: Advanced Clinical Methods in Assessment/Intervention. (2)

Prerequisite: SocW 661.

Linking psychosocial assessment with advanced clinical theory, skills, and techniques. For majors only.

693R. Seminar in Professional Philosophy, Values, and Ethics of Social Work Practice. (2)

Philosophical and ethical basis for social work and family therapy practice, including integrative framework for defining and implementing professional practice. For majors only.

698R. Master's Research**Project. (1-3)**

Prerequisite: SocW 600, 601.

Applying research and statistical methods to evaluative, experimental, and survey studies in social work. Research report of publishable quality required. For majors only.

FACULTY

COX, SHIRLEY, *Associate Professor.*

DSW, University of Utah, 1986.

Ethical Issues; International and Field Practice.

GIBBONS, W. EUGENE, *Professor.* DSW,

University of Utah, 1974. Mental Health; Gerontology.

HORTON, ANNE L., *Associate Professor.*

PhD, University of Wisconsin,

Madison, 1983. Child and Spouse Abuse; Domestic Violence.

MARETT, KEVIN M., *Associate*

Professor. PhD, Purdue University, 1989. Marriage and Family; Prevention.

MATHESON, KENNETH W., *Associate*

Professor. DSW, University of

Utah, 1976. Teaching; School

Social Work; Direct Clinic

Practice; Supervision; Marriage and Family Therapy.

NORMAN, JUDITH L., *Associate*

Professor. DSW, University of

Utah, 1990. Mood Disorders;

Gender.

PEHRSON, KYLE L., *Professor.* DSW,

Catholic University, 1980. Military Social Work.

PETTYS, GREGORY L., *Assistant*

Professor. PhD, University of

Illinois, Urbana-Champaign, 1994.

Mental Health; Children and Youth.

ROBY, JINI L., *Assistant Professor.* JD,

MSW, Brigham Young University,

1990. Social Work Law and Policy.

SEIPEL, MICHAEL M. O., *Associate*

Professor. PhD, Cornell University,

1982. Health Care in Developing

Countries; Poverty.

SPAID, WANDA M., *Associate Professor.*

DSW, University of Utah, 1989.

Gerontology; Mental Illness;

Attachment and Social Supports.

WALTON, ELAINE, *Associate Professor.*

PhD, University of Utah, 1991.

Clinic Practice and Program

Evaluation; Family Preservation

Services.

SOCIOLOGY

Chair: Stephen J. Bahr

Graduate Coordinator: Ralph B.

Brown

800 SWKT

Provo, UT 84602-5547

(801) 378-3392

THE PROGRAM OF STUDIES

The Sociology Department trains graduate students to become capable teachers of sociology and skilled researchers and seeks to maintain excellence in research among faculty, assuring quality instruction as well as providing opportunities for student research involvement.

The Department of Sociology offers two degrees: Sociology—MS and Sociology—PhD.

The Sociology Department admits an average of eight students to both the master's and doctoral programs each fall semester. Full-time students will normally finish a master's degree in two years and a doctoral degree in four years.

Sociology—MS

The purpose of the master's degree in sociology is to prepare students for doctoral work and to train them as teachers and researchers.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination is GRE general test.
- Prerequisite: baccalaureate degree in sociology or equivalent.

Requirements for Degree.

- Credit hours (minimum 32): 26 course work hours, including at least 17 hours of formal course work in sociology, plus 6 hours of thesis (Soc 699R) or 6 hours of project (Soc 698R). Only course work with a grade of B- or better is acceptable.
- Required courses: Soc 600; 605 or 606; 611; 598R for first-year

graduate students fall and winter; minimum 9 additional hours of graduate sociology course work; demonstration of competence in sociological theory, research methods, and statistics.

- Thesis or project.
- Examination: oral defense of thesis or project.

Sociology—PhD

Students who desire a PhD in sociology may pursue a contemporary sociology track or one in studies of the family. Students in the contemporary sociology track will be expected to specialize in family or sociology of religion or petition for an area such as social stratification or race and ethnicity. All PhD students are encouraged to be actively involved with faculty in research and publication.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international)
- Application requirements: entrance examination is GRE general test.
- Prerequisite: master's degree in sociology or equivalent; master's thesis.

Requirements for Degree.

- Credit hours: 48 hours of approved course work, plus 18 dissertation hours (Soc 799R). Only course work with a grade of B– or better is acceptable.
- Required courses: Soc 600, 605, 606, 611, 710, 711; 604 or 608; 598R for first-year graduate students; minimum 9 hours in each of two specialty areas selected for comprehensive examinations; demonstration of competence at the doctoral level by required course work and by examination in sociological theory, research methods, and statistics.
- Qualifier exam at end of first year.
- Dissertation.
- Examinations: (A) written comprehensive examination in one of the following areas of emphasis: Family Sociology or Religion or petition for an area such as social stratification or race and ethnicity;

(B) oral defense of dissertation prospectus.

- Oral defense of dissertation.

FINANCIAL ASSISTANCE

The Sociology Department offers some tuition assistance to students as well as research assistantships and teaching opportunities. Financial assistance is also available through other agencies in the university.

RESOURCES AND OPPORTUNITIES

The Department of Sociology utilizes the Center for Studies of the Family, the Women's Research Institute, and the college computing lab.

The Center for Studies of the Family is an interdisciplinary research center focusing on studies related to all aspects of the family. The institute encourages and supports research on family-related topics ranging from prenatal development to problems of aging. For the past ten years, sociology faculty have participated with the Church Educational System in the CES/Family Doctoral Research Fellowship Program. Three research fellows are chosen every three years who, under faculty direction, carry out a research project. For information about this program, contact the Department of Sociology.

Initially established in 1978, the Women's Research Institute became a part of the College of Family, Home, and Social Sciences in September 1983. Since then the institute has awarded research fellowships to upper-division and graduate students for conducting research on women and women's issues in amounts up to \$500 annually for selected projects.

Faculty research interests cover a broad spectrum of social science research. However, the make-up of the department faculty generates most research in the following areas: family; religion; stratification; social organization and change; gender; race; and community.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

504. Mathematical Sociology. (3)

Prerequisite: Math 105.

Mathematical techniques of simulating and modeling social processes.

515. Seminar in Sociological Practice. (3)

Prerequisite: Soc 315, 600, 606, 610.

Uses of sociological theory and methods to deal with individual, organizational, and societal problems. Techniques for communicating such knowledge to the nonsociologist.

524. Advanced Political Sociology. (3)

Social basis of political behavior. Modern theories and research concerning use of power and decision making.

525. Sociology of Religion. (3)

Prerequisite: Soc 111, 325, or instructor's consent.

Influences of social factors in the development of various religious systems.

527. Sociology of the LDS Church and Its People. (3)

The LDS Church from a social science perspective, including the Church as a new religious movement; LDS culture; the institutionalization process.

528. Sociology of Rural Communities. (3)

Prerequisite: Soc 311, 370, or instructor's consent.

Review and critique of major theoretical and methodological approaches to the study of community, with a focus on rural communities.

530. Sociology of International Development. (3)

Major theoretical paradigms of development with strategies and practical application in the international setting.

550. (Soc-FamSc) Contemporary Family Theories (3)

Prerequisite: FamSc 250, Soc 311; or equivalents.

Introduction to basic micro, macro, and processual approaches to study of the family; social and political theory on the family; philosophical issues and assumptions underlying family theory, research, and practice.

561. The Family Institution. (3)

The family in different societies; problems created by various family systems.

565. (Soc-FamSc 663) The Individual and Family in Later Years. (3)

Developmental aspects of aging, focusing on the biophysical, cognitive, social, affective, and pathological dimensions in people aged fifty and over.

590R. Special Topics in Sociology. (1-3)

Prerequisite: instructor's consent.

Course content varies from year to year.

595R. Directed Readings. (1-3)

Individualized reading program supervised by faculty member. Pass/Fail only.

598R. Pro-Seminar. (1)

Current developments in sociology including research, proposals, professional meetings, teaching, and finding a job.

600. (Soc-FamSc) Graduate Research Methods. (3)

Prerequisite: FamSc or Soc 300 or equivalent.

Logic and conduct of experimental, quasi-experimental, nonexperimental, survey, and qualitative research.

602. (Soc-FamSc) Experimental Design. (3)

Prerequisite: Soc-FamSc 600, Stat 501 or equivalent, or instructor's consent.

Research methods, logic, writing, and data analysis.

603R. (Soc-FamSc) Research Practicum. (3)

Prerequisite: instructor's consent.

Design, data collection, data analysis, and write-up.

604. Ethnographic Research Techniques. (3)

Prerequisite: Soc-FamSc 600.

Rationale, methods, and limitations of qualitative research; includes participant observation and hermeneutic skills.

605. Multiple Regression Analysis (3)

Prerequisite: Soc 306 or instructor's consent.

Ordinary least squares and logistic regression techniques. Data acquisition, management, analysis, and report writing.

606. Intermediate Statistics. (3)

Prerequisite: Soc 306 or equivalent.

Path analysis, factor analysis, and event history techniques.

608. Seminar in Survey Research and Sociological Measurement. (3)

Prerequisite: Soc 600; 605 or 606.

Survey research techniques in the behavioral sciences, emphasizing research and sampling designs. Measurement techniques, emphasizing consequences of measurement decisions.

611. Intermediate Sociological Theory. (3)

Prerequisite: Soc 311 or equivalent.

In-depth survey of major sociological theories, including classical works and major contemporary developments such as new-Marxism, new-functionalism, poststructuralism, feminist thought, modernity, and postmodernity.

620. Theory and Research in Social Organization. (3)

Prerequisite: admission to graduate sociology programs; others admitted by instructor's consent.

Graduate survey of the field of social organization and the core subfields therein.

621. Complex Organizations. (3)

Prerequisite: instructor's consent.

Theoretical approaches and empirical studies of organizations, their structures, processes, and problems; studies of industrial organizations, universities, hospitals, etc.

622. Social Stratification. (3)

Prerequisite: Soc 111.

Status, class, and power systems in various societies.

623. Seminar in Race and Ethnic Relations. (3)

Major theories of race-ethnic relations; critical issues in the field.

625R. Seminar in the Sociology of Religion. (3)

In-depth analysis of theory and research in topical areas of the sociology of religion. Course content varies from year to year.

630. (Soc-Psych 655) Attitude Measurement and Change. (3)

Prerequisite: instructor's consent.

Attitude development, change, and assessment, focusing on both individual and mass persuasion.

637. Sociology of Feminist Theory. (3)

Prerequisite: Soc 367.

Analysis of traditionally accepted models by Freud, Erikson, and Kohlberg from a feminist perspective; review of the works of such contemporary theorists as Chodorow, Gilligan and Elshtain; French and American differences.

645. Seminar on Population Analysis. (3)

Prerequisite: Soc 306 or equivalent.

Availability, use, and interpretation of population data for local, state, and national areas applied to planning and evaluation.

650. Advanced Social Psychology. (3)

Processes of social influence, emphasizing theory and research testing. Basic principles of social behavior.

660. (Soc-FamSc) Child and Adolescent Socialization. (3)

Child and adolescent development in the context of social interaction, with particular emphasis on the family. Current theory and research evaluated.

667. Sociology of Gender. (3)

Gender as a central organizing principle of society; socialization, social and cultural change, social movements, social stratification, and social policy.

670. Contemporary Urban Social Structure. (3)

Prerequisite: Soc 370.

Research-oriented examination of social forces in contemporary urban life that influence patterns of human interaction.

678. Social Policy and Feminist Legal Thought. (3)

Prerequisite: instructor's consent and departmental approval; law students have priority. (Taught by law instructor with law students in class.)

Survey of recent literature regarding the impact of women on law and legal institutions and the impact of law and legal institutions on the definitions, roles, and status of women in our society.

681R. Seminar in Deviance, Crime, and Corrections. (3)

Prerequisite: Soc 380, 381 or 383, or instructor's consent.

In-depth analysis of current issues in the field. Tailored to student interests.

692R. (Soc-FamSc) Seminar in Family Relationships. (3)

Prerequisite: Soc-FamSc 560.

Theory and research in topical areas of family study (topics presented on alternate years).

- Marital Stability
- Power and Gender Roles
- Marital Quality and Communication
- Family, Religion, and Education
- Household and Family Demography

697R. Directed Research. (1–3)

699R. Master's Thesis. (1–6)

706R. Advanced Statistical Methods. (3)

Prerequisite: Soc 605, 606.

Topics include advanced structural equations and hierarchical linear models, or panel data techniques and generalized linear models.

710. Seminar in Classical Sociological Theory. (3)

Prerequisite: Soc 611 or equivalent.

Classical bases of sociological theory; philosophical foundations of sociological theory; works of major theorists such as Marx, Weber, Durkheim, DuBois, and Addams.

711. Seminar in Contemporary Sociological Theory. (3)

Prerequisite: Soc 710 or equivalent.

Recent developments in sociological theory. In-depth analysis of structure and assumptions of contemporary sociological theories.

720R. Seminar: Social Organization. (1–3)

Prerequisite: Soc 111, 620.

750. Seminar: Social Psychology. (3)

Prerequisite: Soc-Psych 650.

Evaluation of current cutting edge theory and research. Course content varies as course is offered every other year.

792R. (Soc-FamSc) Family Symposium. (0.5)

799R. Doctoral Dissertation. (1–9)

FACULTY

BAHR, HOWARD M., Professor. PhD, University of Texas, Austin, 1965. Urban Problems; Ethnic Relations.

BAHR, STEPHEN J., Professor. PhD, Washington State University, 1972. Family; Deviance.

BARBER, BRIAN, Associate Professor. PhD, Brigham Young University, 1987. Sociology of the Family.

BROWN, RALPH B., Associate Professor. PhD, University of Missouri, Columbia, 1992. Rural Sociology; Community Development.

CALL, VAUGHN, Professor. PhD, Washington State University, 1977. Family Life Course; Research Methods; Aging; Education.

CHADWICK, BRUCE A., Professor. PhD, Washington University, 1967. Research Methods; Family.

CORNWALL, MARIE, Professor. PhD, University of Minnesota, 1985. Gender; Religion; Social Change.

DUKE, JAMES T., Professor. PhD, University of California, Los Angeles, 1963. Sociological Theory; Sociology of Religion.

ENGLAND, J. LYNN, Professor. PhD, University of Pittsburgh, 1971. Theory; Community.

FORSTE, RENATA, Associate Professor. PhD, University of Chicago, 1992. Demography; Statistics.

HEATON, TIM B., Professor. PhD, University of Wisconsin, Madison, 1979. Demography.

JACOBSON, CARDELL K., Professor. PhD, University of North Carolina, Chapel Hill, 1971. Social Psychology; American Race/Ethnic Relations.

JOHNSON, BARRY L., Professor. PhD, University of North Carolina, 1977. Statistics; Medical Sociology.

JOHNSON, RICHARD E., Associate Professor. PhD, University of Washington, 1976. Deviance; Criminology.

KNAPP, STAN J., Assistant Professor. PhD, Florida State University, Tallahassee, 1996. Family; Social Theory.

KUNZ, PHILLIP R., Professor. PhD, University of Michigan, 1967. Complex Organization; Population.

TORRES, JOHN C., Assistant Professor. PhD, Stanford University, 1995. Complex Organization; Political Sociology.

WARD, CAROL J., Associate Professor. PhD, University of Chicago, 1992. Race; Ethnicity; Education; Community; Ethnography.

YOUNG, LAWRENCE A., Associate Professor. PhD, University of Wisconsin, Madison, 1989. Macro Sociology; Complex Organization; Religion.

SPANISH AND PORTUGUESE

Chair: Christopher C. Lund
Graduate Coordinator: Jeffrey S. Turley

4050-A JKHB
 Provo, UT 84602-6018
 (801) 378-7019

THE PROGRAM OF STUDIES

Two degrees are offered through the Department of Spanish and Portuguese: Portuguese—MA and Spanish—MA. An additional MA in language acquisition (Portuguese) is offered as part of the collegewide program in language acquisition.

Most students who complete a master's degree in the department either seek jobs in secondary education or continue their studies on the PhD level. Some have located positions with government agencies or in the business sector. Each year from ten to twenty students are admitted to the program. Although some candidates have completed their degree in as few as eighteen months, most usually require twenty-four months to meet all the requirements, and some take up to thirty-six. Students are strongly encouraged to organize their schedules so as to finish the degree in no more than two years. Limits on financial aid available through the department begin after the fifth semester in the program.

Portuguese—MA

Areas of specialization: Portuguese Language, Portuguese Literature.

Admission and Entry.

- Semester of entry and application deadline: fall, February 15 (U.S. and international).
- Application requirements: applicants may be required to have an oral interview or to produce a tape demonstrating language proficiency. Candidates will also submit a one-page composition outlining their academic objectives.
- Entrance examination: GRE general test.

- Prerequisite: baccalaureate degree in Portuguese or equivalent; minimum (last 60 hours) GPA 3.3; minimum Portuguese GPA 3.5.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (699R).
- Thesis.
- Examinations: (A) comprehensive written examination over the reading list; (B) comprehensive oral examination over the student's writing project and area of specialty.
- Complete three semesters (or equivalent) of a second foreign language other than English in addition to language of specialization.

Spanish—MA

Areas of specialization: Spanish Language, Spanish Literature, Spanish-American Literature, Spanish Teaching.

Admission and Entry.

- Semester of entry and application deadline: fall, February 15 (U.S. and international).
- Entrance examination: GRE general test.
- Application requirements: as an entrance examination, applicants may be required to have an oral interview or to produce a tape demonstrating language proficiency. Candidates will also submit a one-page composition in Spanish outlining their academic objectives.
- Prerequisite: baccalaureate degree in Spanish or equivalent; minimum (last 60 hours) GPA 3.3; minimum Spanish GPA 3.5.

Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (699R).
- Required courses: Span 601, 671, 699R; two courses outside specialization (at least one from each of the other two areas of specialization); literature and teaching specialists must take Span 620.

- Three writing options: thesis, two-paper option, or project, all written in MLA or APA style.
- Examinations: (A) comprehensive written examination over the reading list; (B) comprehensive oral examination over the student's writing project and area of specialty.
- Complete three semesters (or equivalent) of a second foreign language other than English in addition to language of specialization.

Language Acquisition (Portuguese)—MA

This program offers professional preparation to students seeking careers in applied linguistics, foreign language education, computer-assisted language learning and instruction, and other related areas.

Generally not more than two students per language are admitted to the language acquisition program per year. Most students complete the degree within two years.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination is GRE general test; fifteen-minute interview in language of specialization addressing applicant's academic goals (may be completed in person, by telephone, or on tape in conversation with a second party).
- Prerequisite: baccalaureate degree and strong background in the language of specialization.

Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours (699R).
- Required courses: Ling 540, 600, 641, 660, 677.
- Departmental specialization (12): 3 hours of advanced linguistic study in language of specialization, plus 9 hours as approved by graduate committee.
- Language requirement: reading and speaking ability (202 level) in language other than English in

addition to language of specialization.

- Thesis: 6 hours of 699R in language of specialization.
- Examination: oral defense of thesis.

FINANCIAL ASSISTANCE

Students may receive a position as a student instructor depending on departmental needs and on their qualifications. All potential student instructors must have completed an undergraduate 3-hour phonetics course and a 3-hour methodology course, and they must participate in an intensive workshop held during the week previous to the commencement of fall classes. Continuing employment and the number of sections assigned to candidates each semester depend on department needs and on the students' performance as instructors and on their own academic progress. Tuition scholarships are available in amounts varying from partial to full tuition.

In addition to employment as student instructors, MA candidates may occasionally find on-campus jobs as readers, teaching assistants, or research assistants.

RESOURCES AND OPPORTUNITIES

The Department of Spanish and Portuguese utilizes the **Humanities Research Center** for world-class computer-assisted language instruction.

Students may choose to participate in a variety of **Study Abroad** programs conducted by the department in Europe and Latin America.

Every third year during the summer term, the College of Humanities offers the **Summer Language Institute**, a program that allows a student total immersion in foreign language teaching while receiving course credit. Housing is provided for participants where the language can be applied on a practical level.

Faculty research interests currently include: language teaching methodology, teacher training, oral proficiency testing, computer-administered placement and speaking tests; Spanish-American women writers, early modern Spanish women writers; Hispanic film, Spanish-American poetry; literature and philosophy; contemporary Hispanic theatre, Mexican prose, metafiction and metatheatre; Hispanic romanticism; Spanish realist narrative, intersemiotic analogies, Spanish cultural studies; translation and interpretation; the *Comedia*; classical Portuguese poetry; Caribbean sociolinguistics; phonetic spectography; romance semantics; Hispanic paleography; mood in the nominal clause; language contact and bilingualism.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

Linguistics

(See Linguistics section of this catalog for courses.)

Portuguese

520. Advanced Portuguese Grammar. (3)

Applying contemporary grammatical concepts to problems in Portuguese grammar.

521. Romance Philology. (3)

Comparative study of the evolution of Latin into the modern Romance languages.

522. History of the Portuguese Language. (3)

Linguistic sources that contribute to formation of Portuguese.

529R. Special Topics in Portuguese Linguistics. (3)

Topics from semantics to dialectology to sociolinguistics.

599R. Academic Internship: Portuguese Internship. (1-3)

Prerequisite: Port 321 and instructor's consent.

For supervised internship credit on BYU Study Abroad programs only.

601A. Portuguese Linguistics and Research Methodology. (3)

601B. Literary Theory and Research Methodology. (3)

629R. Seminar in Portuguese Linguistics. (3)

639R. Luso-Brazilian Theatre Production. (3)

Theory and practice of dramatic performance. Includes participation in a play to be performed during semester. Total Port 639R credit toward any degree may not exceed 3 hours.

642. Camões. (3)

649R. Seminar in Portuguese Literature. (3)

652. Machado de Assis. (3)
Prerequisite: Port 441, 451, or equivalent.

653. Twentieth-Century Brazilian Literature. (3)

Prerequisite: Port 441, 451, or equivalent.

659R. Seminar in Brazilian Literature. (3)

675. Teaching Literature. (3)
Prerequisite: Port 601B

One-third of class time: theory and techniques of literature instruction; two-thirds of class time: practice teaching in undergraduate literature courses. For graduate students who plan to pursue a career in teaching literature.

680R. Directed Research in Portuguese. (1-3)

Prerequisite: written proposal subject to departmental approval.

Under direction of faculty member, designing and conducting research project that covers material not normally presented in regular course work. Research paper required. Total Port 680R credit toward any degree may not exceed 3 hours.

698R. Master's Project. (1-6)**699R. Master's Thesis. (1-9)****Spanish****520. Problems in Spanish Grammar. (3)**

Application of contemporary grammatical concepts to problems in Spanish grammar.

521. Romance Philology. (3)

Comparative study of the evolution of Latin into the modern Romance languages.

522. History of the Spanish Language. (3)

Linguistic sources that contributed to formation of the Spanish language.

527A. Advanced Translation and Interpretation, English to Spanish. (1.5)

Prerequisite: Span 428B, with a B grade or better.

Translation of texts in specific fields. Simultaneous interpretation. From English to Spanish. Taken during first block of fall semester.

527B. Advanced Translation and Interpretation, Spanish to English. (1.5)

Prerequisite: Span 527A.

Translation of texts in specific fields. Simultaneous interpretation. From Spanish to English. Taken during second block of fall semester.

528. Translation and Interpretation Project. (3)

Prerequisite: Span 527.

Individual translation and/or interpretation projects.

529R. Special Topics in Spanish Linguistics. (3)

Prerequisite: Span 520, 522.

Topics could include semantics, dialectology, or sociolinguistics.

577. Spanish Language Teaching Procedures. (3)

For public school teachers.

Mastery of teaching skills specific to foreign language instruction.

Lectures, demonstrations, practical experience. Taught only during summer term.

599R. Academic Internship: Spanish Internship. (1-3)

Prerequisite: Span 321 and instructor's consent.

For supervised internship credit on BYU Study Abroad programs only.

601A. Hispanic Linguistics and Research Methodology. (3)

Basic research fields in linguistics (i.e., phonology, philology, syntax, psycholinguistics), how research differs in each area, and specific theoretical issues associated with each. Bibliographical and field research methods and techniques of reporting findings.

601B. Literary Theory and Research Methodology. (3)

Introduction to literary theory, beginning with Aristotle's *Poetics* and continuing to present, but emphasizing major schools of literary theory in twentieth century. Bibliographical techniques and formats for critical essays.

601C. Research Designs in Hispanic Language Teaching. (3)

Designing and evaluating empirical research studies in foreign language learning and teaching methodology. Bibliographical techniques and methods of reporting findings.

620. Core Course in Hispanic Linguistics. (3)

Required of all MA literature and pedagogy specialists (optional for linguistics specialists who may not apply class to 30-hour requirement).

622. Hispanic Dialectology. (3)

Overview of the varieties of spoken Spanish.

625. Spanish Morphosyntax. (3)

Linguistic study of morphological and syntactic structure of Spanish.

626. Spanish Phonetics and Phonology. (3)

Prerequisite: Span 326 or instructor's consent.

Systematic study of articulatory and acoustic Spanish phonetics and of structural and generative approaches to phonological description of Spanish.

629R. Seminar in Spanish Linguistics. (3)**639R. Hispanic Theatre Production. (3)**

Prerequisite: director's consent.

Theory and practice of dramatic performance. Includes participation in play to be performed during semester. Total Span 539R credit toward any degree may not exceed 3 hours.

640. Medieval Spanish Literature. (3)

Prerequisite: Span 441 or equivalent.

Spanish Literature from *El Cantar de Mio Cid* (1140) through *La Celestina* (1499).

643R. Golden Age Literature. (3)

Prerequisite: Span 441 or equivalent.

Sixteenth- and seventeenth-century Spanish literature.

644. Don Quijote. (3)

Prerequisite: Span 441 or equivalent.

In-depth study of Cervantes's *El ingenioso hidalgo don Quijote de la Mancha*.

646R. Nineteenth-Century Spanish Literature. (3)

Prerequisite: Span 441 or equivalent.

Romanticism (1770s through 1870s) and/or the novels of Benito Pérez Galdós and his contemporaries.

648R. Twentieth-Century Spanish Literature. (3)

Prerequisite: Span 441 or equivalent.

Genre (twentieth-century novel, drama, or poetry) or particular school (Generation of 1898, Generation of 1927, etc.)

649R. Seminar in Spanish Literature. (3)

650R. Pre-Columbian and Colonial Literature. (3)

Prerequisite: Span 451 or equivalent.

Indigenous literature (Maya, Nahuatl, etc.) and other texts written in Spanish colonial America through eighteenth century.

654R. The Spanish-American Novel. (3)

Prerequisite: Span 451 or equivalent.

Selected Spanish-American novelists such as Juan Rulfo, Gabriel García Márquez, Alejo Carpentier, Mario Vargas Llosa, etc.

655R. Spanish-American Poetry. (3)

Prerequisite: Span 451 or equivalent.

Selected Spanish-American poets, movements, and national traditions.

656R. Spanish-American Drama. (3)

Prerequisite: Span 451 or equivalent.

Twentieth-century theatre from Spanish America and Brazil.

658R. The Hispanic-American Short Story. (3)

Prerequisite: Span 451 or equivalent.

Introduction and development of an important literary genre in Spanish America, including works of Jorge Luis Borges, Julio Cortazar, Juan Rulfo, Gabriel García Márquez, and others.

659R. Seminar in Spanish-American Literature. (3)

671. Principles of Foreign Language Learning and Teaching. (3)

Core course work for all MA candidates. Basic theories and principles of language learning and teaching. History, current research, practices, trends, and issues.

672. Media and Technology in Foreign Language Instruction. (3)

Applying modern technology and instructional media in teaching foreign languages.

673R. Directed Teaching of Spanish. (1-3)

Prerequisite: Span 326, 377, and graduate assistantship in department.

Supervised, practical experience in teaching Spanish at the college level.

674. Teaching Hispanic Culture. (3)

Methods of researching and teaching Hispanic culture.

675. Teaching Literature. (3)

Prerequisite: Span 601B

One-third of class time: theory and techniques of literature instruction; two-thirds of class time: practice teaching in undergraduate literature courses. For graduate students who plan to pursue a career in teaching literature.

676. Principles of Testing Foreign Language Skills. (3)

Test development and analysis for assessment of the four skills plus grammar and culture; survey and questionnaire construction.

678. Research Design in Foreign Language Instruction. (3)

Designing and evaluating empirical research studies in foreign language learning and teaching methodology.

679R. Seminar in Teaching Spanish. (3)

For experienced language teachers.

680R. Directed Research in Spanish. (3)

Prerequisite: written proposal subject to departmental approval.

Individualized study. Under direction of faculty member, designing and conducting research project that covers material not normally presented in regular course work. Research paper required. Total Span 680R credit toward any degree may not exceed 3 hours.

698R. Master's Project. (1-6)

Prerequisite: committee chair's consent.

Candidates in nonthesis program may complete approved field project as their writing/research experience.

699R. Master's Thesis. (1-9)

FACULTY

ALBA, ORLANDO, *Professor*. PhD, Universidad Complutense de Madrid, Spain, 1988. Hispanic Sociolinguistics.

ASHWORTH, PETER P., *Associate Professor*. PhD, University of Oklahoma, 1967. Spanish Literature.

CLEGG, J. HALVOR, *Associate Professor*. PhD, University of Texas, Austin, 1969. Phonology; Spanish Language; Linguistics.

CLUFF, RUSSELL M., *Professor*. PhD, University of Illinois, 1978. Latin-American Literature; Translation.

DENNIS, RONALD D., *Professor*. PhD, University of Wisconsin, Madison, 1972. Brazilian Literature.

FAILS, WILLIS C., *Associate Professor*. PhD, University of Texas, Austin, 1984. Spanish and Portuguese Linguistics.

GARCÍA, MARA LUCY, *Assistant Professor*. PhD, University of Kentucky, 1997. Twentieth-Century Spanish-American Literature.

HEGSTROM, VALERIE, *Associate Professor*. PhD, University of Kansas, 1992. Classical Spanish Literature; Hispanic Theatre; Women and Literature.

JENSEN, GORDON K., *Associate Professor*. PhD, University of Wisconsin, Madison, 1975. Portuguese and Brazilian Literature.

LABRUM, MARIAN B., *Assistant Professor*. PhD, Middlebury College, 1988. Spanish-American Literature, Translation.

LARAWAY, DAVID, *Assistant Professor*. PhD, Cornell University, 1998. Spanish-American Narrative and Poetry.

- LARSON, JERRY W.**, *Professor*. PhD, University of Minnesota, Minneapolis, 1977. Spanish Language Acquisition; Methodology; Technology.
- LUND, CHRISTOPHER C.**, *Professor*. PhD, University of Texas, Austin, 1970. Classical Portuguese Literature.
- LYON, THOMAS E.**, *Professor*. PhD, University of California, Los Angeles, 1967. Spanish-American Literature.
- MEREDITH, R. ALAN**, *Associate Professor*. PhD, Ohio State University, 1976. Second-Language Teaching Methodology; Testing; Research Design.
- PRATT, DALE J.**, *Assistant Professor*. PhD, Cornell University, 1994. Nineteenth- and Twentieth-Century Spanish Literature; Literature and Science.
- QUACKENBUSH, L. HOWARD**, *Ludwig-Weber-Siebach Professor of Humanities*. PhD, University of Illinois, 1970. Latin-American Literature.
- ROSENBERG, JOHN R.**, *Professor*. PhD, Cornell University, 1985. Nineteenth- and Twentieth-Century Spanish Literature; Romanticism; Historical Novel; Autobiography.
- SMED, ROBERT N.**, *Associate Professor*. PhD, University of Texas, Austin, 1988. Hispanic Bilingualism, Border Spanish, Spanish Syntax.
- TURLEY, JEFFREY S.**, *Associate Professor*. PhD, University of California, Berkeley, 1992. Spanish Linguistics; Romance Philology; Semantics; Medieval Literature.
- WEATHERFORD, DOUGLAS J.**, *Assistant Professor*. PhD, Pennsylvania State University, 1996. Latin-American Literature.
- WILLIAMS, FREDERICK G.**, *Gerrit de Jong, Jr., Distinguished Professor of Luso-Brazilian Studies*. PhD, University of Wisconsin, 1971. Portuguese and Brazilian Literature.

STATISTICS

Chair: Gale Rex Bryce
Graduate Coordinator: Gilbert W. Fellingham

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THE PROGRAM OF STUDIES

Statistics is a scientific discipline by which statisticians assist other scientists and researchers in making informed decisions in the face of uncertainty. Statisticians use skills—not only in statistics, but in other disciplines such as mathematics, computer science, business, management, and engineering—to solve problems. The application of statistics is the embodiment of the scientific method.

The graduate curriculum is designed to equip students with decision-making skills necessary for successful careers as professional statisticians. Although a firm foundation in theoretical statistics is provided, most of the courses are applied in nature, offering approaches to the solution of important real-world problems.

One degree is offered through the Department of Statistics: Statistics—MS. A statistics minor is also offered at both the MS and PhD level. A five-year combined BS/MS program is also offered, but it is restricted to students who begin their undergraduate major early in their academic career. Contact the department for further details.

About twenty to twenty-five students are currently enrolled in the master's program in statistics. Students with an undergraduate degree in statistics, or with a very strong mathematics background, can generally complete the master's program in a little over one year. Other students generally take two years to complete the program.

Statistics—MS

This program is designed to prepare students for work in industry and government or for PhD work in statistics.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 1 (U.S. and international). Generally, entry to the program occurs fall semester. There are some introductory applied classes available spring and summer for those with a limited background in statistics. (Students applying for the BS/MS program should apply during their junior year.) Contact the department for further information.
- Entrance examination: GRE general test; minimum 3.3 overall undergraduate GPA required. Every international applicant whose native language is not English is required to submit TOEFL scores.
- Prerequisite: Stat 221, 311, 322, 336, Math 241; CS 130; or equivalents. (Students applying to the BS/MS program should have completed Stat 441 as well.) Students whose native language is not English may be required to take one or more ESL classes, depending on the outcome of a departmental interview.

Requirements for Degree.

- Credit hours:
 Thesis option (30): minimum 24 course work plus 6 thesis hours (Stat 699R).
 Project option (33): minimum 30 course work (which must include Stat 590) plus 3 project hours (Stat 698R).
- Required courses: Stat 522, 525, 535, 591R. Other courses from Stat 512, 531, 534, 536, 537, 541, 545, 590, 611, 621, 631, 635, 662, 690R, or other approved courses.
- Minor (optional): any approved minor.
- Thesis or project.
- Examinations: (A) comprehensive written examination covering both theory and methods, (B) oral defense of project or thesis.

Statistics—Minor

The statistics minor is offered to strengthen the data analysis skills of graduate students in the various experimental areas where statistical methodologies are frequently applied.

Master's Level.

- 9 hours in statistics courses numbered 400 or above except 510.
- Methods examination (Stat 511, 512) or theory examination (Stat 441, 442).

PhD Level.

- Stat 441, 442.
- 9 additional hours from statistics courses 500 and above except Stat 510.
- Methods examination (Stat 511, 512) and theory examination (Stat 441, 442).

FINANCIAL ASSISTANCE

The department has limited funds to supplement students' financial needs, and such funds are only available within departmental and university guidelines. Assistance is available in the following forms: tuition awards, internships, research assistantships, and tuition scholarships. For those interested in pursuing research assistantships, a booklet describing current research proposals is available in the department library.

RESOURCES AND OPPORTUNITIES

Center for Collaborative Research and Statistical Consultation. The center operates with full access to all departmental resources to provide statistical expertise to faculty, graduate students, and off-campus researchers in other disciplines. Areas of particular strength are designing experiments and sample surveys and analyzing the resulting data. Problems are solved by application and adaptation of state-of-the-art methodology and development of new methodology as required.

Quality Science Laboratory. The role of the Quality Science Laboratory is to facilitate the study and development of tools and techniques for improving the quality of products and services in the industrial, service, and government sectors. The Department of Statistics has administrative responsibility for the laboratory, but it is used by students from various parts of campus for study in quality technologies as well as to further research in the technology of quality control and improvement. Through the support of various industries, the laboratory is furnished with the latest computer equipment and automated measurement equipment for the collection and evaluation of quality-related data.

Computing Facilities. The Department of Statistics provides several excellent general computer laboratories furnished with modern computing equipment and software suitable for word processing, statistical graphics, data analysis, and statistical computing. These laboratories are reserved for the use of students in the department.

Department Research. The current research plan for the department includes the Learning Research Initiative. This program is designed to help discover information delivery methodologies that positively impact student learning. Other research emphases include methodologies for combining data from multiple sources and the development of statistical tools for total quality management. In addition to these areas, specific research interests for individual faculty are listed in the faculty section immediately following the course descriptions.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

510. Introduction to Statistics for Graduate Students. (3)

Prerequisite: Math 97 or equivalent. Recommended: Math 110 or equivalent.

Introductory statistics course for graduate students outside the Statistics Department. Topics include probability, estimation, hypothesis tests, simple linear regression, analysis of variance.

511. Statistical Methods for Research 1. (3)

Prerequisite: Stat 510 or equivalent.

Basic statistical methodologies and experimental design. Topics include: analysis of variance, multiple regression, analysis of covariance, common experimental designs.

512. Statistical Methods for Research 2. (3)

Prerequisite: Stat 511.

Advanced statistical methodologies. Topics include repeated measures models, basic multivariate techniques, logistic regression, log-linear models.

522. Theory of Linear Models. (3)

Prerequisite: Stat 322, 442; or equivalents.

Linear hypotheses, with application to regression and design.

525. Statistical Inference. (3)

Prerequisite: Stat 322, 442; or equivalents.

Exponential families, likelihood theory, maximum likelihood estimation, likelihood ratio tests, small and large sample tests.

531. Experimental Design. (3)

Prerequisite: Stat 337 or 512.

Power for basic designs, hierarchical designs, change-over designs, confounding in symmetric and asymmetric designs, incomplete block designs, bioassay and response surface designs.

532. Quality Improvement for Engineering. (3)

Prerequisite: Stat 361, Math 113.

Selected topics in statistical theory, analysis of variance, simple and multiple regression, response surface design and analysis, multilevel experimental designs, blocking designs, confounding.

534. Sampling. (3)

Prerequisite: Stat 334; Stat 441 or departmental consent.

Estimation in systematic, simple random, stratified, cluster, and PPS sampling and mixtures of these; ratio estimation; sample size determination and principles of sample allocation.

535. Applied Linear Models. (3)

Prerequisite: Stat 322; 336 or 511.

Analysis of the full rank model, over-parameterized model, cell-means model, unequal subclass frequencies, missing and fused cells. Estimability issues, diagnostics.

536. Modern Regression Methods. (3)

Prerequisite: Stat 322; 336 or 511.

Weighted least squares, measurement error models, robust regression, nonlinear regression, local regression, generalized additive models, tree-structured regression.

537. Generalized Linear Models. (3)

Prerequisite: Stat 522, 535.

Generalized linear models framework, binary data, polytomous data, log-linear models.

541. Advanced Probability. (3)

Prerequisite: Stat 441 or departmental consent.

Stochastic processes, Markov chains, generating functions, birth-death processes, random walks, the gambler's ruin problem, advanced combinatorial methods.

545. Stochastic Processes. (3)

Prerequisite: Stat 441.

Review of elementary probability: expectation, characteristic functions, limit theorems. Introductory random processes: definitions and properties, covariance and spectral density, time average, stationarity, ergodicity, linear system relations, mean square estimation, Markov processes.

563. Advanced Operations Research. (3)

Prerequisite: Stat 441, 463; or equivalents.

Stochastic simulations; integer, nonlinear, and stochastic programming; developments in inventory theory; Markovian decision processes; insurance risks.

590. Statistical Consulting. (3)

Prerequisite: departmental consent.

Introduction to statistical consulting, oral presentations, presentation packages, written reports. Extensive applied experience in the Center for Collaborative Research and Statistical Consulting.

591R. Graduate Seminar in Statistics. (0)**599R. Academic Internship: Statistics. (1-9)**

Prerequisite: departmental consent.

On-the-job experience. Report required.

611. Multivariate Statistical Methods. (3)

Prerequisite: Stat 322; 337 or 512.

Inference about mean vectors and covariance matrices; multivariate analysis of variance and regression; canonical correlation; discriminant analysis; principal component analysis; factor analysis.

621. Advanced Theory of Statistics. (3)

Prerequisite: Math 241, Stat 442; or equivalents.

Theory of estimation, testing hypotheses, multiple regression, and multivariate analysis.

631. Advanced Experimental Design. (3)

Prerequisite: Stat 442, 531.

Response surface methods, optimal designs, mixture designs, designs for nonlinear models, multi-response experiments, robust designs.

635 Mixed Model Methods. (3)

Prerequisite: Stat 525, 535.

Fixed effects, random effects, repeated measures, nonindependent data, general covariance structures, estimation methods.

662. Advanced Industrial Statistics and Reliability. (3)

Prerequisite: Stat 442, 462; Math 241; or equivalents.

Sequential sampling, tolerance limits, life testing, and reliability.

690R. Advanced Special Topics. (3)

Prerequisite: instructor's consent.

695R. Readings in Statistics. (1-3)

Prerequisite: departmental consent.

698R. Master's Project. (3)

Prerequisite: departmental consent.

699R. Master's Thesis. (1-6)

Prerequisite: departmental consent.

FACULTY

BRYCE, GALE R., Professor. PhD, University of Kentucky, 1974.

Industrial Quality Improvement.

CHRISTENSEN, HOWARD B., Professor. PhD, North Carolina State University, 1975. Nonparametrics; Sample Design.

COLLINGS, BRUCE J., Professor. PhD, University of North Carolina, 1981. Actuarial Science; Biostatistics; Combinatorics.

FELLINGHAM, GILBERT W., Associate Professor. PhD, University of Washington, 1990. Biostatistics; Combining Data; Missing and Marginal Data; Bayesian Methods.

GRIMSHAW, SCOTT D., Assistant Professor. PhD, Texas A&M University, 1989. Statistical Computing; Industrial Quality Improvement; Modern Regression Methods.

- HILTON, STERLING C.**, *Assistant Professor*. PhD, Johns Hopkins University, 1996. Longitudinal Data Analysis.
- LAWSON, JOHN S.**, *Associate Professor*. PhD, Polytechnic Institute of New York, 1984. Industrial Statistics; Experimental Design.
- MADRIGAL, J. L.**, *Associate Professor*. DPhil, Oxford, England, 1985. Strategic Decision Making; Industrial and Business Statistics; Biostatistics.
- RENCHER, ALVIN C.**, *Professor*. PhD, Virginia Polytechnic Institute, 1968. Multivariate Analysis; Linear Models.
- SCHAALJE, G. BRUCE**, *Associate Professor*. PhD, North Carolina State University, 1988. Design and Analysis of Experiments; Population Modeling; Application of Statistics in Biology and Agriculture.
- SCOTT, DEL T.**, *Professor*. PhD, Pennsylvania State University, 1977. Statistical Computing; Categorical Data Analysis; Linear Models.
- TOLEY, H. DENNIS**, *Professor*. PhD, University of North Carolina, 1974. Health and Actuarial Statistics.
- WHITING, DAVID G.**, *Assistant Professor*. PhD, Texas A&M University, 1995. Spatial Statistics; Statistical Genetics; Computational Statistics.
- WOLFSON, LARA J.**, *Assistant Professor*. PhD, Carnegie-Mellon University, 1995. Bayesian Methods; Applied Decision Theory; Expert Opinion.

TEACHER EDUCATION

Chair: M. Winston Egan
Graduate Coordinator: Michael O. Tunnell

215-B MCKB
 Provo, UT 84602-5099
 (801) 378-7080

THE PROGRAM OF STUDIES

The Department of Teacher Education offers graduate programs in teaching/learning and reading. Master's programs are designed to improve the art and science of teaching or to prepare educators to function as curriculum specialists. The doctoral program is designed to prepare educators to function in the following career roles: diagnostic-remedial reading specialist, developmental reading specialist, reading consultant/coordinator/supervisor, or university professor.

Three degrees are offered through the Department of Teacher Education: Teaching and Learning—MA, Teaching and Learning—MEd, and Reading—EdD.

Master's students generally complete their program in two years, whereas doctoral students average about three and a half years to complete their program.

Teaching and Learning—MA, Teaching and Learning—MEd

The MA in teaching and learning requires the completion and defense of a thesis. The MEd requires the completion and defense of a professional improvement project. A minimum of 26 semester hours must be completed at BYU.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, and summer, February 1; winter, September 15.
- Application requirements: minimum required 3.25 GPA for last 60 hours; one year as a certified

teacher in an elementary school classroom.

- Entrance examination: GRE general test. Scores (not to be more than five years old) must be submitted with the application.
- Requirements for Degree.**
- Credit hours (36): minimum 36 course work hours.
 - Required courses: MA—EIEd 672R, Stat 510; MEd—EIEd 672R.
 - Remaining courses determined in consultation with graduate committee. A maximum of 10 semester hours of approved graduate transfer credit is allowed.
 - MA thesis (6 hours): EIEd 699R. MEd: professional improvement project (3 hours), EIEd 693R (1 hour), 695R (1 hour), 696R (1 hour).
 - Examinations:
 - MA: comprehensive oral examination and oral defense of thesis.
 - MEd: comprehensive oral examination and oral defense of project.

Reading—EdD

The EdD program in reading features specific programs developed by students and faculty to help students prepare for careers as professors, reading specialists, etc.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, and summer, February 1; winter, September 15.
- Application requirements: minimum 3.25 GPA for last 60 hours. Successful completion of three years as a certified teacher in an elementary school classroom Admission application evaluated by department graduate faculty. Admission considered according to the resources available.
- Entrance examination: GRE general test. Scores (not to be more than five years old) must be submitted with the application.

Requirements for Degree.

- Credit hours (95): minimum 95 hours, including 12 dissertation hours (EIEd 799R). Up to 36 hours from an approved master's degree may apply.

- Tool requirements (included in 95 required hours): Stat 510, 511.
- Required courses: Stat 512, IP&T 653; or IP&T 652, EEd 672R.
- Credit hours: 36 hours required in reading, including 12 hours of dissertation. A minimum 12 hours must be taken outside the McKay School of Education, or 12 hours must be concentrated within another department of the school. Remaining hours are to be determined in consultation with the graduate committee.
- Residency: two consecutive full-time semester registrations (9 hours each).
- Dissertation.
- Examinations: (A) written and oral comprehensive examinations taken upon completion of course requirements; (B) oral defense of dissertation.

FINANCIAL ASSISTANCE

A limited number of departmental graduate and research assistantships are available. To qualify, a student must be registered full-time. Most assignments are in supervisory positions over elementary education undergraduate majors.

RESOURCES AND OPPORTUNITIES

Computer laboratories provide students with access to the Internet. Macintosh and Windows computers in the laboratories also provide graduate students with a variety of computer software packages. All computers have access to Route Y, the university intranet, which provides services such as e-mail and class discussion groups. The Internet links permit students to search library catalogs and databases originating at the university and at countless locations around the world.

Graduate Student Office Space. Office space is provided for graduate students who are working with faculty on research, evaluation, and development projects.

Study Areas. Study areas are available in the Science Education Laboratory and the McKay School of Education Learning Resource Center.

Advanced Literacy Eye-Movement Research Lab. This lab provides opportunities for doctoral students to collaborate with faculty in conducting a wide range of literacy research.

COURSE DESCRIPTIONS

Elementary Education

Note: EEd 514R is for certification purposes only and is listed in the BYU Undergraduate Catalog.

515R. Special Topics in Education. (1-3)

Two hours of 515R credit are acceptable if taught by graduate faculty and approved by the candidate's committee.

- Art in Education
- Children's Literature
- Classroom Management
- Curriculum Innovations
- Dance Drama in Education
- Early Childhood Education
- Effective Teaching
- Evaluating Student Learning
- Foundations
- Health Education
- Home-School Relations
- Human Development
- Investigating Home Schooling
- Language Arts
- Mathematics
- Microcomputers in Schools
- Multicultural Education
- Music in Education
- PE in Education
- Precision Teaching
- Program Evaluation
- Reading
- Reading in the Content Areas
- Science
- Social Science
- Writing in the Elementary School

530. Principles of Learning. (3)

Improving classroom learning through understanding underlying psychological principles and theories.

533. Written Expression in the Elementary Schools. (2)

Foundation, objectives, and strategies for teaching the writing process to elementary students, including spelling, handwriting, and integration with listening and speaking skills.

620. Organization and Administration of Reading Programs. (2)

Examining ways to organize and administer school and classroom reading programs. Examining issues relating to program types, reading assessment, grouping, grade level articulation, and supervision.

628. Curriculum Development and Supervision of Instruction. (2)

Principles and procedures in curriculum development; role of the supervisor in improving instruction and staff performance.

632. Science in Elementary Education. (2)

Teaching elementary science; current developments and trends. Planning instructional materials and procedures for a science curriculum.

633. Trends and Issues in Literacy Education. (3)

Research, literature, and trends in listening, speaking, and writing, with their implications for instruction.

635. Mathematics in Elementary Education. (2)

Issues, research, and innovations in teaching elementary school - mathematics.

636. Social Studies in Elementary Education. (2)

Domains, methods, and theories of social studies, including innovative content, e.g., law-related education, consumer education, etc.

640. Literature for Young People. (3)

Overview of (primarily) American literature for elementary school pupils; contemporary authors, trends, and classroom applications.

641. Trends and Issues in Reading. (3)

Developmental, functional, and recreational reading, with focus on research, literature, and trends in reading instruction.

642. Emergent Literacy. (2)

Needs of young readers and approaches to teaching them to read.

645. Classroom Reading Diagnosis. (3)

Formal and informal diagnostic procedures for classroom teachers to use in assessing and correcting reading deficiencies.

647. Comprehending Expository and Narrative Text. (2)

Comprehending and retaining text materials in different subject areas, including study and writing strategies for learning from school texts.

648R. Practicum in Reading. (1-4) Prerequisite: EIED 645.

Diagnosing reading difficulties, designing effective teaching strategies, and evaluating effectiveness of instruction.

650. Technology in Reading and Evaluation of Reading Materials. (1-3)

Using available software and technology for reading instruction in elementary schools and a critical analysis of print and nonprint materials.

660. Historical Foundations in Reading. (2)

In-depth study of the history of reading education, books, and reading instruction with implications for present-day reading practices.

672R. Introduction to Research Design. (1-3)

Introduction to designing, conducting, analyzing, reporting, and evaluating research studies in education.

676. Research in Reading. (2)

Prerequisite: EIED 641.

Research literature in reading, both classical and current, emphasizing application of findings to educational practice.

680R. Professional Internship. (1-6)

Professional work experience in area of specialization under direction of a faculty member.

690. Master's Colloquium. (1)

Current research and educational studies by faculty and students for collegial critique and analysis.

693R. Directed Individual Study. (1-4)

695R. Independent Research. (1-6)
Conceptualizing, designing, implementing, and evaluating a student-initiated project in a school classroom for curriculum improvement.

696R. Professional Education Project. (1-6)

Developing, observing, gathering, interpreting, and reporting data derived from a project in relation to the student's professional assignment.

699R. Master's Thesis. (1-6)

Formal report and defense of substantive research, evaluation, or curriculum project designed to make an original contribution to knowledge in the field.

731. Principles of Curriculum Development. (2)

Prerequisite: EIED 628 or instructor's consent.

Curriculum planning and design and its implementation in schools.

734. Literacy Seminar. (2)

Significant research and publications in language arts and their implications for classroom practice.

740. Theoretical Models of Reading. (2)

In-depth study of the theoretical models of the reading process. Statistical, psychological, literary, linguistic, and motivational models analyzed and critiqued.

741. Psychology and Physiology of Reading. (2)

Physiology of the eye, ear, and brain as these relate to the reading act and potential reading disabilities; psychophysical measurement methods.

742. Teaching Reading Vocabulary and Comprehension. (2)

Theories and research studies of vocabulary acquisition and reading comprehension as they relate to effective teaching.

743. Oral Language Acquisition: Parallels in Reading and Writing Development. (2)

Developmental reading stage theories, writing development theories, and invented spelling research; how these relate to oral language acquisition.

780R. Professional Internship. (1-8)

Professional work experience in area of specialization under direction of a faculty member.

790R. Advanced Seminar. (1-3)

Significant research and publications and their implications to reading instruction.

793R. Directed Individual Study. (1-4)

795R. Independent Research. (1-6)

Conceptualizing, designing, implementing, and evaluating student-initiated research.

799R. Dissertation. (1-12)

Formal report and defense of substantive research, evaluation, or curriculum project designed to make an original contribution to knowledge in the field.

Secondary Education

515R. Special Topics in Education. (1-3)

- Learning and Teaching
- Science Education
- Middle Education
- Teaching Reading in the Content Area

531. Effective Classroom Instruction. (2)

Developing strategies to initiate and to maintain effective learning in elementary and secondary classrooms. Expanding teaching perspectives and acquiring observation skills.

539R. Practicum in Learning and Teaching. (1–8)

Experience in a school setting under direction of college faculty.

601. Structure, Function, and Outcomes of Education. (3)

Relationships between purposes of education and means selected to achieve those aims. Establishing and maintaining integrity in educational practice.

606. Western Educational Thought and Practice. (3)

History of educational thought and practice, including pedagogical reform, national systems, and recent trends.

607. Multicultural Education. (3)

Exploring common cultural universals from archaic and modern societies to develop skills for learning within a culturally diverse environment.

649. College and Adult Basic Reading. (2)

Prerequisite: one course in reading or instructor's consent.

Adult basic education programs; advanced work in community college and university reading services.

660. Historical Foundations in Reading. (2)

In-depth study of the history of reading education, books, and reading instruction, with implications for present-day reading practices.

693R. Directed Individual Study. (1–4)**698R. Master's Project.** (1–6)**699R. Master's Thesis.** (1–6)**FACULTY**

BIRRELL, JAMES R., *Assistant Professor*. EdD, University of Nevada, Las Vegas, 1993. Qualitative Research; Multicultural Education.

BUNDERSON, EILEEN D., *Assistant Professor*. PhD, Brigham Young University, 1983. Gender Issues in Science.

CHILCOAT, GEORGE (SKIP), *Professor*. EdD, Arizona State University, 1983. Social Studies Education.

CLARK, D. CECIL, *Professor*. PhD, Stanford University, 1965. Evaluation Theory and Design; Research Methodology; Evaluation and Improvement of Teaching.

CUTRI, RAMONA MAILE, *Assistant Professor*. PhD, University of California, Los Angeles, 1997. Multicultural and ESL/Bilingual Education; Teacher Education; Social Foundations of Education.

EARLE, RODNEY S., *Professor*. PhD, Indiana University, 1981. Teacher Planning Processes; Instructional Design; Assessment.

EDWARDS, CLIFFORD H., *Professor*. EdD, University of Utah, 1968. Statistics and Measurement; Social Psychology.

ELDREDGE, J. LLOYD, *Professor*. EdD, University of Utah, 1970. Reading; Language Arts; Discipline; Motivation.

ERICKSON, LYNNETTE B., *Assistant Professor*. PhD, Arizona State University, 1996. Social Studies Education; Teacher Education.

FAWSON, PARKER C., *Associate Professor*. EdD, Brigham Young University, 1989. Reading.

HARDY, GARRY R., *Professor*. EdD, University of Houston, 1977. Science Education.

HARRIS, R. CARL, *Professor*. PhD, Pennsylvania State University, 1971. Educational Reform; Hypermediated Case Studies.

JACOBS, JAMES S., *Professor*. EdD, University of Georgia, 1978. Children's Literature.

MONROE, EULA E., *Professor*. EdD, George Peabody College for Teachers of Vanderbilt University, 1980. Mathematics Education; Curriculum and Instruction.

MORRISON, TIM, *Associate Professor*. PhD, University of Illinois, 1986. Reading; Language Arts.

OSTLUND, MARGARET F., *Assistant Professor*. PhD, University of California, 1993. Teacher Education.

PINNEGAR, STEFINEE E., *Associate Professor*. PhD, University of Arizona, 1989. English, TESL.

SMITH, STEPHANIE Z., *Assistant Professor*. PhD, University of Wisconsin, Madison, 1998. Mathematics Education.

TEEMANT, ANNELA, *Assistant Professor*. PhD, Ohio State University, 1997. Foreign Language and ESL Education; Testing and Evaluation; Quantitative Statistics.

TOLMAN, MARVIN N., *Professor*. EdD, Utah State University, 1975. Science Education.

TUNNELL, MICHAEL O., *Professor*. EdD, Brigham Young University, 1986. Children's Literature.

WENTWORTH, NANCY McMILLAN, *Assistant Professor*. PhD, University of Utah, 1993. Technology in Education; Mathematics Curriculum and Instruction; Teacher Education.

WILCOX, BRADLEY R., *Assistant Professor*. PhD, University of Wyoming, 1994. Reading; Language Arts; Teacher Education.

YOUNG, JANET, R., *Assistant Professor*. PhD, University of Oklahoma, 1996. Reading.

SCHOOL OF TECHNOLOGY

Director: Thomas L. Erikson

Graduate Coordinator, Engineering Technology: Brent Strong, (801) 378-7878

Graduate Coordinator, Technology Education: Loren Martin, (801) 378-6493

265 CTB
Provo, UT 84602-4206
(801) 378-7433

THE PROGRAM OF STUDIES

Recently the School of Technology was established to provide an organizational structure to enhance and strengthen technology programs at BYU. At the time of the publication of this catalog, further enhancements and changes to the graduate programs were still under consideration. Please contact the School of Technology for the most recent program information.

Two degrees are offered through the School of Technology: Engineering Technology—MS and Technology Education—MS.

Engineering Technology—MS

The engineering technology programs at BYU have long been considered among the premiere programs in the country. The new master's program in engineering technology has been designed for students interested in the rapidly advancing electronics and manufacturing technologies.

This master's degree integrates modern technologies of electronics, systems design, manufacturing, automation, process flow, and quality control into useful working systems. The graduate program provides an intensive period of study in the procedures and methodologies needed to implement theoretical principles in modern industrial practice.

This program is primarily available to graduates from technology and engineering programs who are inter-

ested in manufacturing and/or electronics processes. Graduates from other programs may be considered.

Admission and Entry.

- Semesters of entry and application deadlines: fall, spring, summer, February 15 (U.S. and international); winter, September 15 (U.S. and international).
- Application requirements: 3.0 or higher GPA. Consult graduate coordinator for additional information.
- Entrance examinations: GRE general test. For all international applicants whose native language is not English, a TOEFL score of 570 is also required
- Prerequisite: baccalaureate degree in engineering technology, engineering, or a related field with departmental approval; basic sciences background, along with engineering mathematics, electronics, and manufacturing methods.

Requirements for Degree.

- Credit hours (34): minimum 25 course work hours plus 9 thesis hours (Tech 699R).
- Required courses: at least four courses from Mfg and/or EET graduate course offerings, plus Tech 591R (1 hour).
- Electives: minimum 12 hours from approved courses. The electives must include one mathematics course above integral calculus or one approved statistics course (unless satisfied before entering program). A study list of proposed courses is required.
- Thesis: minimum 9 thesis hours; prospectus.
- Examination: oral defense of thesis.

Technology Education—MS

The MS degree programs in technology education provide two options for completing graduation requirements. The student may elect the summer residency program or the full-time, on-campus program. The summer residency program consists of a minimum three to four full-time summers on campus, with interven-

ing approved field experiences during fall and winter semesters.

Admission and Entry.

Semesters of entry and application deadlines: fall, winter, spring, summer, February 15 (U.S. and international).

Requirements for Degree—Project Option.

- Prerequisite: valid teaching certificate or minimum 30 semester hours in acceptable technology or vocational education courses.
- Credit hours: minimum 34 hours, including field project (Tech 698R).
- Required courses:
History and Philosophy: TTE 610 or 615.
Curriculum: TTE 625, 645; IP&T 560 or 620.
Research: IP&T 672 or EdLF 672 or EIEd 672; TTE 694R, Tech 698R.
- Electives: at least 8 in technology education; remaining hours may be from business, construction management, educational leadership, counseling, secondary curriculum, or technical depth.
- Project.
- Examination: written and oral defense of course work.

Requirements for Degree—Thesis Option.

- Prerequisite: 30 hours of acceptable undergraduate technology or vocational education courses, or a minimum six years of vocational experience.
- Credit hours (34): minimum 28 course work hours plus 6 thesis hours (Tech 699R).
- Required courses:
History and Philosophy: TTE 610 or 615.
Curriculum: TTE 625, 645.
Management: TTE 535, 640; IP&T 560 or 620.
Research: TTE 694R, Tech 699R; IP&T 672 or EdLF 672 or EIEd 672; Stat 510.
- Electives: at least 6 hours in technology education. Remaining hours may be from business, construction management, educational leadership, educational psychology, counseling, technical depth, or as approved by committee.

- Thesis.
- Examination: oral defense of course work and thesis.

FINANCIAL ASSISTANCE

The school offers research and teaching assistantships during the academic year to graduate students. During summer term, a part-tuition scholarship is available for qualified graduate students.

Applications for awards may be obtained from the school and returned at least by the beginning of the semester.

RESOURCES AND OPPORTUNITIES

Nationally recognized instructional laboratories are available to provide students with the most current concepts, curriculum, software, equipment, and laboratory instructional/physical organization.

COURSE DESCRIPTIONS

Construction Management

520. Advanced Bidding, Scheduling, and Cost Control Systems. (3)

Innovative estimating, bidding, and scheduling techniques; integrating the estimate and schedule to create a system for managing and controlling costs and time.

540. Construction Productivity Improvement. (3)

Construction productivity improvement through two approaches: management issues and field issues. Management strategies that can contribute to productivity and quality improvement.

550. Construction Company Development and Strategic Planning. (3)

Advanced topics in construction company operations and management, including strategic planning processes, company growth and development, systems management, and performance analyses.

570. Integrating Construction Software. (3)

Integrating information generated through state-of-the-art hardware and software using scheduling, cost control, estimating, spreadsheet, database, and word processing to improve construction processes.

Electronics Engineering Technology

528. Electronic Fabrication and Assembly. (3)

Prerequisite: EET 314 or equivalent and instructor's consent.

Introduction to modern processes used to produce electronic devices and equipment, including integrated circuits, printed circuit boards, optical fiber, computers, and all types of electronic components.

529. Information Processing and Networks. (3)

Prerequisite: Phscs 221 or equivalent; EET 443 or instructor's consent.

Function and system analysis and application for sensing, sending, and processing information; metallic and light-wave technology networking; data, media, standards, topologies, protocols, instrumentation, and integration.

540. Computer-Aided Testing. (3)

Prerequisite: instructor's consent.

Applying distributed intelligence to testing. Instrumentation bus standards, IEEE 488, fieldbus, and others. Advanced instrumentation.

548. Mechatronics. (3)

Prerequisite: EET 444 or instructor's consent.

Synergistic application of mechanical devices, electronic controls, and system principles in designing products and manufacturing processes. Advanced applications of electronic instrumentation, control, and automation in manufacturing systems.

Manufacturing Engineering Technology

501. Fundamentals of Manufacturing Processes, Design, Materials, and Information Transfer. (3)

Overview of how things are made, with focus on the interrelation of manufacturing processes, design, materials, and information transfer. Importance of manufacturing in society.

531. Advanced Computer-Aided Manufacturing Programming. (3)

Prerequisite: previous introductory computer-aided manufacturing programming; senior or graduate status or instructor's consent.

CAD/CAM programming techniques and requirements for manufacturing components on computer numerical-control machine tools, emphasizing CAM programming, postprocessors, and CAM software evaluation.

532. Manufacturing Systems. (3)

Prerequisite: Mfg 480 or instructor's consent.

Analysis and comparison of different manufacturing systems, such as batch manufacturing, flexible manufacturing systems, and cellular manufacturing, including design issues and applications.

533. Manufacturing Information Systems. (3)

Prerequisite: Mfg 480 or instructor's consent.

Application and integration of software and information technologies in the planning, executing, and monitoring of production operations.

536R. Advanced Process Mechanics (3)

Prerequisite: MeEn 472 or equivalent.

Analysis and experimental validation of selected manufacturing processes.

538. Technical Management. (3)

Techniques and tools for effective technical management. Management, analysis, cost justification, and communication skills within manufacturing or engineering environments.

541. Advanced Materials Science. (3)

Prerequisite: MeEn 250; CEEEn 203; or equivalents.

Builds on student's manufacturing and materials background to investigate interrelationship of material and process.

555. Composite Materials and Processing. (3)

Prerequisite: instructor's consent.

Structure, processing, properties, and uses of composite materials, including various manufacturing methods and the relationship between properties and fabrication.

572. Design for Manufacturing. (3)

Prerequisite: senior standing.

Introduction to design evaluation techniques, including design for mechanical assembly, printed circuit board assembly, plastic injection molding, machining, and sheet metal fabrication.

574. Advanced Tool Design. (3)

Prerequisite: introductory CAD design course and polymer materials and processes.

Advanced design of net-shape tooling utilizing CAD and CAE methods. Plastic injection molding for design and construction. Experimental validation of analytical predictions.

580. Manufacturing Simulation. (3)

Prerequisite: instructor's consent.

Design and optimization of manufacturing systems using simulation. Simulation languages and modeling methodology.

592R. Materials Seminar.(0.5)

Advanced topics in materials science and engineering.

655. Polymer Processing. (3)

Prerequisite: MeEn 312, Mfg 355, or instructor's consent.

Rheology and transport phenomena involving polymeric fluids, including an analysis of extrusion, calendaring, die forming, mixing, compression and injection molding, molding of reacting polymers, filament winding, and pultrusion.

674. Production System Design. (3)

Prerequisite: Mfg 533 or instructor's consent.

Designing manufacturing systems for competitive advantage. Factory layout, simulation, and design and tooling design. Integration of manufacturing design into product development process.

675. (Mfg-MeEn) Advanced Manufacturing Strategies for Product Development. (3)

Prerequisite: MeEn 272 or equivalent.

Theoretical and experimental study of manufacturing methods such as machining, forming, casting, welding, etc.

Technology

591R. Graduate Seminar. (0.5)

Prerequisite: graduate standing.

Topics in research and thesis writing. Graduate students will present thesis subject.

601. Research and Development in Technology. (3)

Research and development strategies and techniques in technology. Emphasizes preparing proposals for thesis research.

695R. Technology Special Topics. (1-9)

Prerequisite: instructor's and departmental consent.

Topics arranged in consultation with instructor.

696R. Advanced Technological Processes. (1-3)

Developing and implementing solutions to special problems; advanced skills/concepts in traditional and emerging technology areas.

698R. Master's Project. (1-3)

Prerequisite: departmental consent.

699R. Master's Thesis. (1-9)

Prerequisite: departmental consent.

Technology Teacher Education

505. Technology for the Elementary School. (2)

Basic concepts and activities needed to prepare elementary students to cope with their technological society. Fee.

535. Applied Technology Safety Program Development. (2)

Identifying and implementing programs for safety and facilities management that comply with state and national legislation. Fee.

593R. Workshop in Applied Technology Education. (1-2)

Reviewing and participating in current industrial and technological advances. Maximum of 2 credit hours can be applied to MS program. Fee.

610. History and Legislation of Vocational and Technology Programs. (2)

Historical basis of today's vocational/technological programs, with emphasis on past and current funding.

615. Philosophical Basis of Technological Programs. (2)

Rationale for vocational and technology programs, including current and future trends and social, economic, and environmental impacts.

625. Instructional Management for Applied Technology Courses. (2)

Identifying, developing, and implementing instructional strategies unique to vocational-technical programs.

630. Adult Applied Technology Programs. (2)

Identifying, developing, and implementing relevant applied technology training programs.

635. Facility Design for Applied Technology Programs. (2)

Developing instructional facilities and educational specifications for vocational and technology laboratories.

640. Coordination and Supervision of Applied Technology Programs. (2)

Methods, regulations, and policies used in supervising vocational and technical education programs.

645. Visual and Graphic Presentations in Applied Technology Programs. (2)

Identifying, developing, and using visual and graphic material for vocational and technology programs.

694R. Readings and Conference. (1-2)

FACULTY

- CARTER, PERRY W., II**, *Assistant Professor*. PhD, University of Massachusetts, 1988. Automatic Assembly.
- CHRISTENSEN, KIP W.**, *Associate Professor*. PhD, Colorado State University, 1991. Teacher Education.
- CHRISTOFFERSON, JAY P.**, *Assistant Professor*. PhD, Colorado State University, 1996. Computerized Systems in Construction Management.
- EREKSON, THOMAS L.**, *Professor*. EdD, University of Illinois, 1979. Technology and Society; Leadership Development.
- GONZALES, RONALD F.**, *Professor*. PhD, Purdue University, 1982. Teacher Education.
- HARRELL, CHARLES R.**, *Associate Professor*. PhD, University of Denmark, 1988. Simulation.
- HAWKS, VAL D.**, *Associate Professor*. MS, Lehigh University, 1986. CIM Database Management Systems.
- HELPS, C. RICHARD G.**, *Associate Professor*. Msc (Eng.) Witwatersrand University, Johannesburg, South Africa, 1986. Real-Time; Process Control; Automation Systems.
- JOHNSON, A. KENT**, *Associate Professor*. DSc, Stevens Institute of Technology, 1965. Electronic Fibers.

- KOHKONEN, KENT E.**, *Assistant Professor*. MS, Brigham Young University, 1976. CNC Software Development; Processing Languages; Parametric Programming.
- LUNT, BARRY M.**, *Assistant Professor*. PhD, Utah State University, 1993. Manufacturing and Assembling Electronic Devices.
- MARTIN, LOREN**, *Professor*. EdD, Utah State University, 1973. Teacher Education.
- NELSON, TRACY**, *Assistant Professor*. PhD, Ohio State University, 1998. Materials; Welding Metallurgy.
- NEWITT, JAY S.**, *Professor*. PhD, Colorado State University, 1980. Construction Scheduling and Project Controls.
- OWEN, EARL F.**, *Assistant Professor*. MS, University of Utah, 1972. RF Microwave Circuits.
- ROGERS, LEON R.**, *Associate Professor*. PhD, Texas A&M University, 1989. Management Systems in Construction.
- SMART, MERRILL J.**, *Associate Professor*. MS, University of Utah, 1962. Real-Time Computer Systems.
- STRONG, A. BRENT**, *Professor*. PhD, University of Utah, 1971. Composites; Plasma Surface Treatments; Plastics.

THEATRE AND MEDIA ARTS

Chair: Bob Nelson

Graduate Coordinator: Marion Bentley

D-581 HEAC

Provo, UT 84602-6405

(801) 378-2122

THE PROGRAM OF STUDIES

The Department of Theatre and Media Arts supports the university's synthesis of religious, humanistic, artistic, and professional education. The department serves people who love theatre and media arts and believe in the value of the arts in education.

Recognizing the need to enrich people's lives through theatre and media arts, the department seeks excellence in the study and practice of these arts by stressing rigorous scholarship, high artistic standards, and Christian behavior. The department (1) educates broadly in the best liberal arts tradition; (2) develops disciplined scholars, artists, and educators; and (3) prepares articulate, thinking, caring individuals who will effectively serve their professions, their communities, and their church.

We believe in the power of the arts and in the capacity of theatre and media arts to enlighten, humanize, civilize, and edify. The desire of human beings through the ages to create art and to pursue beauty for its own sake becomes, in the light of the gospel, powerful evidence of people's divine nature and parentage. Such a spiritual assurance of the eternal validity and importance of the arts brings, in turn, greater meaning and satisfaction to the study of theatre and media arts at BYU.

Three degrees are offered through the Department of Theatre and Media Arts: Theatre and Film—MA, Theatre Design and Technology—MFA, and Theatre and Film—PhD.

Theatre and Film—MA

Areas of emphasis: Theatre or Film History, Theory, Criticism; Theatre for Young Audiences.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international); summer, December 31 (international) and February 1 (U.S.).
- Application requirements: entrance examination is GRE general test (scores subject to review); samples of written work demonstrating capacity to function at acceptable graduate student entry level.
- Prerequisite: acceptable undergraduate background in theatre arts or media arts.

Requirements for Degree.

- Credit hours (32): minimum 26 course work hours plus 6 thesis hours (TMA 699R) (minimum 20 hours must be in theatre/media arts or theatre/media arts-related courses).
- Required courses: TMA 690; 9 hours in graduate-level history, theory, and criticism—either 3 hours in media arts and 6 in theatre, or 6 hours in media arts and 3 in theatre, depending upon area of emphasis.
- Minor (optional): any approved minor.
- Production: at least one significant production experience, determined in consultation with advisory committee (evaluation will occur immediately after the production).
- Thesis: thesis must make a genuine contribution to body of knowledge and meet highest academic standards (departmental style guides are MLA and Turabian). Three kinds of thesis research will be accepted: (A) scholarly analysis of theatre or media arts history, theory, or criticism; (B) research and strong creative achievement in theatre or media arts; or (C) measurement studies.
- Examinations: (A) comprehensive written examination; (B) comprehensive oral examination; (C) oral defense of thesis.

Theatre Design and Technology—MFA**Admission and Entry.**

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: entrance examination is GRE general test (scores subject to review); resumé and portfolio; samples of written work demonstrating capacity to function at acceptable graduate student entry level; interview with area committee.
- Prerequisite: TMA 102, 104, 112, 121, 123, 201, 202, 235, 260, 265, 266, 267, 335, 363, 460, 461R, 466R; VASu 108, 422R; or equivalents.

Requirements for Degree.

- Credit hours: minimum 60 course work hours, including 6 project hours (TMA 698R).
- Required courses: TMA 515R, 569R, 599R, 600, 601, 662R, 668, 674R, 690, 698R, 731, 732, 797R.
- Electives (15 hours selected from the following in consultation with advisory committee): TMA 562, 569R, 670, 678, 697R; ArHC 504, 506, 510, 520, 525, 530, 540, 550, 600R.
- Off-campus internship (TMA 599R).
- Project (minimum 6 hours; TMA 698R): design and supervision of scenery, lighting, or costumes for at least one full-length production (must be reported in thesis form and accepted by area committee).
- Examinations: (A) comprehensive written examination; (B) comprehensive oral examination; or (C) oral defense of project.

Theatre and Film—PhD

Areas of emphasis: Theatre or Film History, Theory, Criticism; Theatre for Young Audiences.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international); summer, December 31 (international) and February 1 (U.S.).
- Application requirements: entrance examination is GRE general test

(scores subject to review); samples of written work demonstrating capacity to function at acceptable doctoral student entry level.

- Prerequisite: acceptable master's degree in theatre or film.

Requirements for Degree.

- Credit hours beyond bachelor's degree (78): minimum 45 hours in theatre and media arts; 15 hours in approved minor; 18 dissertation hours (TMA 799R).
- Required courses: TMA 690; 18 hours in graduate-level history, theory, and criticism—either 6 hours in media arts and 12 in theatre, or 12 hours in media arts and 6 in theatre, depending upon area of emphasis.
- Language/Skill requirement: select one of three options:
Option 1. One Language, in Depth (Reading/Speaking Ability): specific language to be determined in consultation with graduate committee. Demonstrate competency through completion (grade B or better) of 300-level literature and culture course, taught in the language, or equivalent. Or, demonstrate competency by means of special examination, in consultation with graduate committee, that will test ability to translate literature in field competently and communicate orally in the language.
Option 2. Two Languages (Reading Ability): specific languages to be determined in consultation with graduate committee. Demonstrate competency through passing of two-semester intensive reading course in the languages, or equivalent.
Option 3. One Language (Reading Ability) and One Skill Subject: specific language and skill subject—which must be outside the department—to be determined in consultation with graduate committee. Demonstrate competency in language through passing two-semester intensive reading course in the language, or equivalent. Demonstrate competency in skill subject through completion (grade B or better) of 9 semester hours of

graduate-level course work, as approved by graduate committee.

- **Production:** at least one significant production experience, as determined in consultation with advisory committee (evaluation will occur immediately after the production).
- **Dissertation:** dissertation must make a genuine contribution to body of knowledge and meet highest academic standards (departmental style guides are MLA and Turabian). Three kinds of dissertation research will be accepted: (A) scholarly analysis of theatre or media arts history, theory, or criticism; (B) research and strong creative achievement in theatre or media arts; or (C) measurement studies.
- **Examinations:** (A) comprehensive written examination; (B) comprehensive oral examination; or (C) oral defense of dissertation.

FINANCIAL ASSISTANCE

The following financial support is available through the Department of Theatre and Media Arts:

Assistantships. Graduate students work in the following areas—costume shop, lighting, musical theatre (accompanist, movement), properties, publicity, research, stage management, teaching (assistantships for TMA 101, 102, 114, 123, 124, 201/202, 235/335), and theatre for young audiences.

Candidates must have appropriate background and experience to be considered. Assistantships range from quarter-time to half-time; pay is based on applicant's experience, year in school, and the type of assistantship.

Internships. The department occasionally offers a quarter-time internship during fall and winter semesters and spring and summer terms. Internships range from \$660 to \$1,350 per semester.

Supplemental Tuition Awards. A number of supplemental tuition awards are offered by the depart-

ment during all semesters and terms. The size of these awards is determined by the applicants' qualifications and the availability of departmental funds.

RESOURCES AND OPPORTUNITIES

The Harris Fine Arts Center houses the Department of Theatre and Media Arts, five theatres, two concert halls, rehearsal rooms, an electronic media development lab, a television sound stage, a PBS affiliate, and a 24-hour FM station. These facilities, as well as a feature-film studio near campus, serve as laboratories for graduate students.

Graduate students also may perform individually and with some of the many talented groups on campus.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

515R. Workshop 3: Special Projects. (1–6)

Prerequisite: major status; TMA 112, 114; instructor's consent.

Advanced special projects in theatre or media arts.

516R. Theatre and Media Arts Instruction. (1–3)

Prerequisite: major status; TMA 112, 114; instructor's consent.

Developing teaching methods and techniques.

535R. Directing Workshop. (3)

Prerequisite: Major status; TMA foundation and core courses; TMA 235, 335, 410R; by proposal/application only.

Advanced experience in production: directing.

550R. Theatre for Young Audiences. (3)

Prerequisite: major status or instructor's consent; TMA 112, 114.

Theories, techniques, and experience in creating formal drama for child and youth audiences.

551R. Playwriting 4. (3)

Prerequisite: major status or instructor's consent; TMA 112, 114, 451, or equivalent.

Workshop course designed to assist more advanced students in furthering their playwriting skills by writing or rewriting a play.

552. Improvisation. (3)

Prerequisite: major status or instructor's consent; TMA 112, 114, 123.

Informal or improvised dramatic techniques with children, adolescents, and/or adults.

557. Storytelling. (2)

Prerequisite: major status or instructor's consent.

Theories, techniques, and practice in the art of telling spellbinding stories.

562. Costume Design 3. (2)

Prerequisite: major status; TMA 112, 114, 462.

Advanced conceptual approaches to costume design. Strong background in costuming required. Designers for main-season productions will be selected from students enrolled in this course.

563. Scenic Design 3. (2)

Prerequisite: major status; TMA 112, 114, 463.

Advanced conceptual scenic design. Assumes strong background in scenography. Designers for main-season productions may be selected from students enrolled in this course.

564. Lighting Design 3. (2)

Prerequisite: major status; TMA 112, 114, 464, or equivalent.

Advanced conceptual lighting projects. Assumes strong background in lighting. Designers for main-season productions may be selected from students enrolled in this course.

565. Specialty Costumes. (2)

Prerequisite: major status; TMA 112, 114, 265A, 265B, or equivalent.

Advanced skills in millinery, dyes, footwear, and allied project areas.

567R. Makeup Project. (1-6)

Prerequisite: major status; TMA 112, 114, 467, or equivalent.

Practicum in makeup design and application. Main-season production designers and teaching assistants will be enrolled in this course.

568. Sound. (2)

Prerequisite: major status; TMA foundation courses.

Basics in sound design and reinforcement. Work on main-season productions.

569R. Design for Production. (1-4)

Prerequisite: major status; TMA 112, 114, or equivalent; instructor's consent.

Practical experience working with main-season designers; related topics.

599R. Academic Internship. (1-9)

Prerequisite: major status; TMA 112, 114, or equivalent.

Off-campus experience or internship in theatre or media arts.

600. Advanced History 1: Theatre. (3)

Prerequisite: TMA 201, 202; or equivalents.

Primitive, classical, medieval, and Renaissance theatre through seventeenth century.

601. Advanced History 2: Theatre. (3)

Prerequisite: TMA 201, 202; or equivalents.

Theatre, eighteenth century to present.

660R. Advanced Voice and Interpretation. (3)

Prerequisite: TMA 121, 122, 123, 355; or equivalents.

Continuation of TMA 355. Polishing vocal and interpretative skills through performances.

662R. Seminar in the Theory and History of Theatrical Costuming. (3)

Prerequisite: TMA 112, 215, 262, 515R, 569R; or equivalents.

Major movements and evolution of costuming theory, providing research and design experience.

668R. Special Studies in Theatre, Film, or Television. (1-3)

Supervised research in selected historical, theoretical, or critical problems.

670. Advanced Set Construction. (3)

Prerequisite: TMA 266 or equivalent.

Special problems in scenery construction and rigging.

671R. Advanced Directing. (3)

Prerequisite: TMA 201, 202, 235, 335; or equivalents.

Theories and techniques of directing for the stage through directing projects for public presentation.

674R. Projects in Theatre and Film. (1-4)

Supervised applied theory in playwriting/screenwriting, directing, acting, design, criticism, stagecraft.

680R. Advanced Film Production. (5)

Prerequisite: TMA 244, 285, 341, 385, 387; or equivalents; instructor's consent.

Advanced 16-mm filmmaking.

685R. Screenwriting 4. (3)

Prerequisite: TMA 387, 441R, and instructor's consent.

Advanced practical experience in screenwriting.

689. Motion Picture History. (3)

Worldwide survey of advanced motion picture history.

690. Introduction to Graduate Studies in Theatre and Film. (3)

Introductory seminar required of all graduate students during first semester or term that class is offered.

697R. Seminar and Production: Special Theatre Forms. (2-3)

Prerequisite: instructor's consent.

Theory and practice directing in special forms: readers theatre, avant-garde, etc.

698R. Master's Project. (1-6)

699R. Master's Thesis. (1-9)

700R. Master Seminar. (3)

Selected topics.

731. Dramatic Theory and Criticism 1. (3)

Development from beginning to nineteenth century.

732. Dramatic Theory and Criticism 2. (3)

Development from nineteenth century to present.

772R. Seminar in Child Drama. (3)

Prerequisite: TMA 550R, 552; or instructor's consent.

Advanced theory and research in drama and theatre with and for children.

788R. Symposium for Filmmakers. (3)

Prerequisite: TMA 285, 387; 680R or concurrent registration; instructor's consent.

Symposium to stimulate and enhance perception and understanding of motion picture industry and its historical, contemporary, and social context.

797R. Research. (Arr.)

799R. Doctoral Dissertation. (1-18)

FACULTY

BENTLEY, MARION J., *Professor*. PhD, University of Utah, 1968. Directing; Acting; Dialects; Theatre History.

FIELDING, ERIC, *Professor*. MFA, Goodman School of Drama, Art Institute of Chicago, 1976. Set Design; Lighting Design; Theatre Management.

HEINER, BARTA, *Associate Professor*. MFA, American Conservatory Theatre, 1977. Acting; Directing.

MORGAN, DAVID E., *Associate Professor*. MFA, National Theatre Conservatory, 1990. Acting; Directing.

NELSON, GEORGE D., *Associate Professor*. MFA, University of Washington, 1979. Secondary Education; Child Drama.

NELSON, BOB, *Associate Professor*. PhD, University of Utah, 1976. Acting; Directing; Theatre History; Dramatic Theory and Criticism.

OAKS, HAROLD R., *Professor. PhD*, University of Minnesota, Minneapolis, 1964. Child Drama; Children's Theatre; Puppetry; Directing.

SAMUELSEN, ERIC, *Assistant Professor. PhD*, Indiana University, 1991. History; Theory; Criticism.

SCANLON, RORY R., *Associate Professor. MFA*, University of Illinois, 1984. Set and Costume Design; Costume History; Lighting Design.

SLOVER, TIM, *Assistant Professor. PhD*, University of Michigan, 1993. Playwriting; Screenwriting.

SWENSON, JANET L., *Professor. MFA*, University of Utah, 1992. Costume Design; Costume History; Makeup.

SWENSON, SHARON, *Assistant Professor. PhD*, University of Utah, 1993. Film History; Theory; Criticism.

WALKER, O. LEE, *Assistant Professor. MIE*, Brigham Young University, 1975. Technical Theatre; Stage Management.

VISUAL ARTS

Chair: Mark J. Johnson

Graduate Coordinators:

Art Education: Donna Kay Beattie

Art History: Martha Peacock

MFA Programs: Bruce H. Smith

B-509 HFAC

Provo, UT 84602-6402

(801) 378-4429

THE PROGRAM OF STUDIES

Three postgraduate degrees are offered in the Department of Visual Arts: Art Education—MA, Art History and Curatorial Studies—MA, and Studio Art—MFA. Each requires practicing the component disciplines of art, as well as acquiring certain skills, knowledge, and understandings.

These three strong graduate programs examine and promote the study, creation, and teaching of the visual arts, historically and from contemporary perspectives. Faculty in each area are recognized leading practitioners as well as students of the theoretical, philosophical, and professional issues of their respective academic specialties. The academic thrust of graduate studies in the Department of Visual Arts provides a rich blend of the theoretical and the practical for a balanced understanding of art. High standards for study and practice in each degree program promote the high levels of professional practice and accomplishment expected of and achieved by our graduates.

The average number of students in each program and the duration of each program is as follows:

- Art Education: 12 students as a cohort group in program; two years to completion.
- Art History: 16 students in program; three years to completion.
- Studio Art: 20 students in program; two years to completion.

Art Education—MA

The MA in art education offers two options. Option A requires a research-oriented thesis; it is intended for individuals who plan to pursue a PhD or an EdD in art education. Option B requires a practical curriculum project; it is designed for individuals who teach and make art. Both options require 36 credit hours.

Admission and Entry.

- Next semester of entry and application deadline: fall 2000, February 1, 2000 (U.S. and international).
- Application requirements: slide portfolio of applicant's recent work; one or two written papers demonstrating applicant's writing skills; minimum 3.0 GPA for last 60 hours.
- Prerequisite: baccalaureate degree in art education from an accredited institution (applicants holding other teaching degrees may be considered if art deficiencies are completed to the satisfaction of the Art Education Admissions Committee); certification to teach in public schools at the elementary or secondary level; minimum two years of teaching experience.

Requirements for Degree.

- Credit hours: minimum 32 hours for Option A; 36 hours for Option B. For both options: minimum 26–32 course work hours primarily from 500- and 600-level courses (no more than 9 hours of 300- or 400-level courses may apply), plus 6 thesis or 4 project hours (Art 699R or 698R).
- Course requirements for *Option A*: 15 hours of core art education seminar, 5 hours of education research and writing, and 6 elective hours (may include approved courses taken outside the department).
- Course requirements for *Option B*: 15 hours of core art education seminar, 9 hours divided among art studio and art history courses, 6 elective hours (may include approved courses taken outside the department), and 2 hours of educational writing.
- Acceptance by department of thesis or curriculum project proposal.

- Thesis or curriculum project:
Option A, thesis, 6 hours;
Option B, project, 4 hours.
- Select graduate committee during first semester and submit study list.
- Examinations: (A) written comprehensive examination during final semester of residency, (B) oral defense of thesis or project.

Art History and Curatorial Studies—MA

The MA in art history and curatorial studies is designed to prepare students for advanced graduate study and to provide a foundation for students desiring a career in a museum or art gallery.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Application requirements: minimum 3.3 GPA for last 60 hours.
- Prerequisite: baccalaureate degree in art history or related field, including at least 20 credit hours in art history.

Requirements for Degree.

- Credit hours (30 hours): minimum 24 course work hours plus 6 thesis hours (ArtHC 699R).
- Required courses: ArtHC 500, 505, 510, and courses selected in consultation with the graduate coordinator and graduate committee chair (the MA program is designed to allow maximum exposure to the various areas of art history and curatorial studies).
- Language requirement: reading knowledge of at least one foreign language, preferably French, German, or Italian; similar competence recommended in a second language.
- Thesis.
- Select graduate committee during first semester and submit program of study.
- Examinations: (A) final written comprehensive examination; (B) oral defense of thesis.

Studio Art—MFA

A terminal degree, the MFA in art at Brigham Young University is dedicated to generating artists with significant skills and understandings that can influence the discipline. The MFA has four areas of specialization: Ceramics, Painting-Drawing, Printmaking-Drawing, and Sculpture. Each area requires 60 credit hours. A minor in art history may be earned by completing an additional 9 hours.

Admission and Entry.

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international) **Note:** The number of resident MFA candidates is restricted by availability of individual studio space.
- Application requirements: minimum 3.0 GPA for last 60 hours; complete university and department graduate application forms; submit a twenty-slide portfolio of applicant's work.
- Prerequisite: baccalaureate degree in art or equivalent with minimum 20 hours of upper-division course work and 12 hours of art history. (Applicants with MA degree in art from another institution may request departmental approval to transfer graduate credit.)

Requirements for Degree.

- Credit hours:
MFA degree (60 hours): minimum 55 hours of approved course work, plus 5 hours of thesis credit.
With an art history minor (69 hours): minimum 9 graduate hours of art history seminars in addition to above requirements.
- Time limitations: the degree must be completed within five years. After two years of residency there is no guarantee of financial assistance or studio privileges.
- Course requirements:
First-year core classes (15 hours):
ArtHC 500 (2), 505 (2), 510 (2);
VASTu 618 (3), 619R (3), 698R (3).
Seminar requirements (4 hours):
VASTu 623R (.5–2), 695R (.5).

Studio specialization (24 hours): in addition to the 6 hours of studio classes required in the first-year core. All drawing courses are considered an integral part of the four areas of specialization.

Electives (6 hours): these courses may exceed departmental boundaries if approved by the graduate committee.

Art history (6 hours).

Final project (5 hours).

- Select graduate committee during first semester.
- File program of study during first semester.
- Evaluations
Semester exhibition required prior to each full faculty review.

Review evaluations: two semester reviews required of all MFA students—the midterm committee review and the full faculty review. The evaluations will be directed around five categories outlined in an evaluation form and scored 1–4: (1) work ethic and volume and depth of work, (2) presence and appropriateness of content and conceptual concerns, (3) suitability and proficiency of formal qualities, (4) merit and relevance of craftsmanship and technique, and (5) quality of presentation. The two scores will be averaged together to form each student's semester rating: 3 and 4 will constitute a satisfactory, 2 a marginal, and 1 an unsatisfactory evaluation. Two semesters of satisfactory evaluations must be acquired before a student can present a preliminary exhibition and move toward a final project.

Preliminary exhibition: the student is required to install, for approval, an exhibition with a proposal for final project.

- Oral examination: following the preliminary exhibition, the student is given an oral examination to determine competency.

- Final project (March): to be produced and exhibited while enrolled in VASu 698R.
- Project justification: to reflect and validate final project; defended in an oral defense before the graduate committee.

FINANCIAL ASSISTANCE

Financial assistance is available through tuition waivers, supplemental awards, and teaching assistantships.

RESOURCES AND OPPORTUNITIES

Museum of Art. BYU's Museum of Art is a wonderful environment for the presentation and research of art and the various disciplines related to its analysis, theory, history, display, and reception. Whether it is an individual work, a collection, or an entire exhibition, students are encouraged to look, reflect, analyze, challenge, and enjoy.

Faculty and students engage collaboratively with the museum in projects that yield exhibitions, texts, documentaries, and other forms of presentation. Major exhibitions from its own collection of over 15,000 works and from other important collections are brought to the museum to provoke inquiry and to contribute to the university's academic discourses. Lectures, conferences, performances, and other educational experiences occur regularly in the museum's varied and versatile spaces.

The Museum of Art is one of the most spectacular buildings on campus, and whether it is a rigorous academic exercise, a social encounter with art, or lunch at the cafe, all students and faculty are assured a great experience there.

Art Studio Space. Studio space is provided for graduate students in all emphasis areas.

Art Resource Center. The center is an important library resource for graduate study of content, methods of inquiry, and methodology in the

visual arts disciplines intrinsic to current art education programs. A wide variety of books, journals, art reproductions, curricula, and other visual materials and aids are available.

History Slide Library. A major resource for graduate student research and teaching, the slide library houses a collection of 100,000 slide reproductions of paintings, sculptures, architectural structures, and various minor arts. Furthermore, a number of students work in the library on assistantships or internships. A computerized indexing system enables a student to seek and find materials under broad categories of iconographic content—for example, art work dealing with animals, death, or certain kinds of landscapes.

COURSE DESCRIPTIONS

Art History and Curatorial Studies

500. Art in Theory: Spectatorship. (2)

Prerequisite: graduate status.

Review and critique of major theoretical approaches in art history, emphasizing philosophical relationship between viewer and object.

505. Art in Theory: Language. (2)

Prerequisite: graduate status.

Review and critique of major theoretical approaches in art history, emphasizing recent interest in language and semiotics.

510. Art in Theory: Context. (2)

Prerequisite: graduate status.

Review and critique of major theoretical approaches in art history, emphasizing space of display, the museum, and the work's social reception.

520R. Studies in Ancient Art. (3)

Selected topics in Greek and Roman art.

530R. Studies in Medieval Art. (3)

Selected topics in early Christian, Byzantine, Romanesque, and Gothic art.

540R. Studies in Renaissance Art. (3)

Selected topics in northern and southern Renaissance art.

550R. Studies in Baroque Art. (3)

Selected topics in northern and southern baroque art.

560R. Studies in Eighteenth- and Nineteenth-Century Art. (3)

Selected topics in eighteenth- and nineteenth-century art of Europe and America.

570R. Studies in Modern and Contemporary Art. (3)

Selected topics in modern and contemporary art of Europe and America.

580R. Studies in Architecture. (3)

Selected topics in architecture of Europe and America.

590R. Studies in Curatorship. (3)

Selected topics in curation and the museum.

600R. Individual Study. (1–8)

In-depth study into any chosen art-historical era.

699R. Master's Thesis. (1–6)

Visual Arts Design

The Department of Visual Arts does not offer a graduate degree in design, but offers the following graduate courses:

610R. Advanced Problems in Design. (1–8)

Prerequisite: admission by portfolio.

Individual research and project development.

630R. Advanced Problems in Industrial Design. (1–8)

Prerequisite: admission by portfolio.

Individual research and project development.

631R. Advanced Presentation Methods for Industrial Design. (1–8)

Prerequisite: admission by portfolio.

Individual research and project development.

640R. Advanced Problems in Graphic Design. (1-5)
Prerequisite: admission by portfolio.
Individual research and project development.

644R. Advanced Problems in Illustration. (1-5)
Prerequisite: admission by portfolio.
Individual research and project development.

Visual Arts Education

578R. Art Education Studio. (3)
Prerequisite: graduate student status.
MA courses in ceramics, drawing, figure drawing, oil painting, aqueous painting, printmaking, crafts, and sculpture, as well as digital art.

594R. Special Problems in Art Education. (1-3)
Topics dealing with current education issues.

678R. Art Education Seminar: Issues and Trends. (3)
Seminar topics emphasizing issues and trends in art education. Topics investigated, discussed, and evaluated, depending on student needs.

698R. MA Curriculum Project. (1-4)

699R. Master's Thesis. (1-6)

Visual Arts Studio

618R. Core Drawing. (3)
Prerequisite: acceptance into the MFA graduate program.
Overview of advanced image-making concepts utilizing traditional and contemporary drawing issues.

619R. Studio Methodologies. (3)
Prerequisite: VASu 618R; graduate status.

Work in student's own discipline, with considerable peer evaluation via collective critiques and seminar-type instruction.

620R. Readings. (3)
Graduate readings in the visual arts.

621R. Drawing Studio. (3)
Prerequisite: admission to graduate program.

622R. Figure-Drawing Studio. (3)
Prerequisite: VASu 621R.

623R. Current Exhibitions Seminar. (0.5-2)
Prerequisite: second-semester graduate status; instructor's consent.

Investigation of current and historical issues through exposure to regional, national, and international repositories of art. Written research, analysis, and justification.

627R. Painting Studio. (3)

650R. Intaglio Studio. (3)

651R. Lithograph Studio. (3).
Refining technical skills, collaborative procedures, and conceptualization of image versus process in the art of lithography.

656R. Sculpture Studio. (3)

659R. Ceramics Studio. (3)

694R. Special Problems. (1-3)
Prerequisite: graduate status and instructor's and committee consent.

695R. Seminar. (.5)
Student and faculty analysis of curriculum relationships; projection of student objectives; contemporary topics.

698R. Selected Project (1-5)

FACULTY

ADAMS, BRENT, Associate Professor.
MFA, University of Utah, 1992.
Computers.

ALLEN, VON D., Associate Professor.
MFA, Syracuse University, 1983.
Ceramics.

ANDERSON, BETHANNE, Assistant Professor. MFA, Brigham Young University, 1979. Illustration.

BARRETT, ROBERT, Professor. MFA, University of Iowa, 1976.
Illustration.

BARSCH, WULF E., Professor. MFA, Brigham Young University, 1972.
Painting.

BARTON, GAROLD C., Assistant Professor. MFA, Ohio State University, 1994. Printmaking.

BEATTIE, DONNA KAY, Associate Professor. PhD, University of Kansas, 1990. Art Education.

BRINKERHOFF, VAL, Associate Professor.
MFA, Utah State University, 1987.
Photography.

CHRISTENSEN, BRIAN D., Assistant Professor. MFA, Washington University, St. Louis, 1992.
Ceramics.

DAY, MICHAEL D., Professor. EdD, Stanford University, 1973. Art Education.

GRAY, CAMPBELL B., Adjunct Professor.
PhD, University of Sussex, England, 1995. Director, Museum of Art. Curatorial Studies; Art History Theory.

HALTERN, HAGEN G., Associate Professor. MFA, Kunstakademie, Dusseldorf, Germany, 1976.
Painting.

HAMILTON, CHARLES M., Professor.
PhD, Ohio State University, 1978.
Architectural History; Medieval Art and Architecture.

HILL, SHERRON D., Associate Professor.
PhD, University of Iowa, 1973.
Art Education.

HONEY, PEGGY, Assistant Professor.
BA, Brigham Young University, 1982. Interior Design.

HULL, RICHARD, Associate Professor.
BFA, Brigham Young University, 1987. Illustration.

JOHNSON, MARK J., Professor. PhD, Princeton University, 1986.
History of Roman, Early Christian and Byzantine, and Medieval Art and Architecture.

KIMBALL, W. WAYNE, JR., Professor.
MFA, University of Arizona, 1970.
Printmaking.

MARSHALL, JOHN, Professor. MA, Brigham Young University, 1968.
Industrial Design.

MARSHALL, ROBERT L., Professor. MA, Brigham Young University, 1968.
Painting.

MYER, PETER L., Professor. MFA, University of Utah, 1959.
Painting.

OSTRAFF, JOSEPH E., Assistant Professor. MFA, University of Washington, 1982. Painting.

PEACOCK, MARTHA, Associate Professor. PhD, Ohio State University, 1989. History of Netherlandish Art.

PULFER, ADRIAN, *Associate Professor*.
BFA, Brigham Young University,
1988. Graphic Design.

SMITH, BRUCE H., *Professor*. MFA,
University of Utah, 1968.
Painting.

SULLIVAN, LINDA, *Assistant Professor*.
MFA, University of Utah, 1993.
Graphic Design.

TAYLOR, DAVID, *Associate Professor*.
MA, Brigham Young University,
1982. Interior Design.

TELFORD, JOHN, *Associate Professor*.
MFA, University of Utah, 1988.
Photography.

ZOOLOGY

Chair: Richard R. Tolman

Graduate Coordinator: Reuben Ward
Rhees

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THE PROGRAM OF STUDIES

Graduate programs in zoology address the science of all animal life—including man. Students majoring in the department increase their appreciation of nature, obtain skills of critical thinking, and learn to implement analytical judgment relevant to the biological world.

Our Zoology Department, consisting of thirty faculty members, is organized into two graduate divisions based on faculty and academic expertise: Ecology and Systematics and Cellular Biology. Graduate students in these divisions may specialize in academic and practical areas ranging from environmental science to cellular and molecular biology. Constant attention is paid to new ideas and changing methodologies that affect awareness and implementation of biological information.

The Department of Zoology offers three degrees: Biological Science Education—MS, Zoology—MS, and Zoology—PhD. The department also offers two interdepartmental degrees: Molecular Biology—MS and Molecular Biology—PhD.

Areas of specialization:

Master's Degree: Biological Science Education, Anatomy, Cell Biology, Conservation Biology, Ecology, Entomology, Genetics, Physiology, Systematics, Wildlife and Range Resources, Zoology.

PhD Degree: Anatomy, Cell Biology, Conservation Biology, Ecology, Entomology, Genetics, Physiology, Systematics, Wildlife and Range Resources, Zoology

The Department of Zoology has approximately fifty graduate stu-

dents enrolled each year. About half will be studying in the Ecology and Systematics Division, and about half in the Cellular Biology Division. Students generally complete all requirements for a master's degree within two years, whereas PhD students routinely require from three to four years beyond the MS degree to complete their doctoral program.

Admission and Entry.

All graduate programs in zoology have the same admission and entry requirements, unless otherwise stated:

- Semesters of entry and application deadlines: fall, February 1 (U.S. and international).
- Entrance examination: GRE general test (scores must be submitted with application to be considered for regular admission). Foreign students whose native language is not English must submit TOEFL scores.

Applicants are encouraged to communicate with the Zoology Department for further information or to obtain a copy of the graduate student handbook.

Biological Science Education—MS

This MS degree program prepares graduates to become outstanding teachers of broad-based biological science at all academic levels. Furthermore, these prospective teachers are taught to address important bio-ethical and socioeconomic problems dealing with science and technology today.

Admission and Entry.

See preceding admission and entry requirements.

Requirements for Degree.

- Credit hours: minimum 24 approved course work hours plus 6 project hours (Zool 698R) for total 30 hours.
- Required courses: Zool 503, Zool 696R (1 hour).
- Project.
- Examinations: (A) oral examination on course work; (B) oral defense of project.

Zoology—MS

This MS degree program gives participants a balanced core of classes that provides them with a broad background in zoology. Research specialties cover all forms of animal life—including man—and incorporate use of a wide variety of currently used research tools to give students an in-depth study of life.

Admission and Entry.

See preceding admission and entry requirements.

Requirements for Degree.

- Credit hours: minimum 24 hours plus 6 thesis hours (Zool 699R) for a total of 30 hours.
- Required courses: Zool 503, 696R (1 hour).
- Thesis: standard university thesis format or journal publication format.
- Examinations: (A) oral defense of research; (B) oral examination on course work; (C) oral defense of thesis.

Zoology—PhD

This PhD degree program is a comprehensive academic endeavor in one of a wide variety of disciplines within general zoology. As with the MS program in zoology, a PhD program in this track permits students to research a wide variety of animals using a diversity of biological techniques. Considerable attention at the PhD program level is placed on methodical collection of research data, in-depth statistical analyses, and preparation of all material for eventual publication in peer-reviewed scientific journals.

Admission and Entry.

- See preceding admission and entry requirements.
- Prerequisite: master's degree in zoology or equivalent.

Requirements for Degree.

- Credit hours: 54 hours, including 18 hours of dissertation (Zool 799R).
- Required courses: Zool 503, 696R (1 hour).

- Students who have earned a master's degree must complete at least 36 semester hours of additional graduate work at BYU beyond the master's degree.
- Dissertation: standard university dissertation format or journal publication format.
- Examinations: (A) comprehensive examination: grant proposal and literature review; (B) oral examination on research project and course work; (C) oral defense of research; (d) oral defense of dissertation.

Molecular Biology Program—MS or PhD

Graduate degrees in molecular biology at Brigham Young University are coordinated by the Molecular Biology Program in the College of Biology and Agriculture. This degree prepares students in the philosophy, procedures, and tools used to perform biological research at the molecular level. Specializations are available from molecular biology faculty in the Department of Zoology.

Admission and Entry.

Students should apply to the Molecular Biology Program in the college and designate their preferred area of specialization as Zoology. See Admission and Entry in the Molecular Biology section of this catalog.

Requirements for Degree.

See Requirements for Degree in the Molecular Biology section of this catalog.

FINANCIAL ASSISTANCE

The Department of Zoology offers the following financial aid: teaching assistantships, research assistantships, and tuition awards. Specific endowment fund awards in natural history, physiology and anatomy, and general zoology are also available.

RESOURCES AND OPPORTUNITIES

Program and degree resources include not only the laboratories and

equipment within the John A. Widtsoe Building, but also such facilities as the following: (1) the Monte L. Bean Life Science Museum (located on the BYU campus), with important and significant collections of over 1 million insects, 3 million non-insect arthropods, and thousands of marine invertebrates, amphibians, reptiles, fish, birds, and mammals; (2) the Electron Microscope Laboratory (also on campus), with both transmission and scanning microscopes equipped with X-ray microanalysis, image processing, and electron channeling capabilities, and (3) the Lytle Ranch Preserve (in southwestern Utah), comprising 572 acres of land located in a transition zone between the Mojave Desert and the Great Basin ecosystems.

In addition, graduate students in our department have direct access to other facilities listed for our College of Biology and Agriculture (such as the Benson Agriculture and Food Institute), as well as others that have been made available through long-term association with members of our own faculty (such as the marine laboratories at Friday Harbor, Washington, or at Stanford, California). The Benmore Experiment Station, Dugway Proving Grounds, Desert Range Experiment Station, and Ephraim Experiment Station are federally owned public field stations that are also used for ecology and environmental impact research programs.

For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.

COURSE DESCRIPTIONS

503. Research Orientation. (1)

Departmental graduate procedures; techniques used in researching zoological literature. Students must register for this class the first fall semester of their graduate studies.

510. Genetics of Natural Populations. (4)

Prerequisite: Zool 475 or equivalent.

Basic principles of population genetics applied to natural populations; drift, selection, and nonrandom mating; inferring population subdivision, migration, and gene flow.

515R. Science In-Service. (1-5)

In-service course for science teachers. Subjects that may be offered include:

- Advanced Topics Science In-Service
- Ecology Science In-Service
- Genetics Science In-Service
- Evolution Science In-Service
- Botany Science In-Service
- Meteorology Science In-Service

532. Insect Classification. (4)

Prerequisite: Zool 331.

Recommended: Zool 330.

Insect systematics, emphasizing external morphology, natural history, evolution, distribution, and phylogeny. Insect collection required.

536. Comparative Toxicology. (3)

Prerequisite: general biology and a course in organic chemistry.

Modes of action and biological transformations of pesticides in living animals, plants, and the environment, emphasizing techniques.

537. Aquatic Entomology. (3)

Prerequisite: Zool 331 or equivalent.

Morphology, classification, biology, and functional ecology of aquatic insects.

546. World Bird Families. (4)

Prerequisite: Zool 446 or instructor's consent.

Distribution, composition, and characteristics of world bird families, using museum specimens.

547. Raptor Biology. (2-4)

Prerequisite: Zool 446 or instructor's consent.

Biology and conservation of major groups of predatory birds, using museum specimens.

549R. Advanced Topics in Zoology. (1-4)

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Anatomical Preparations
- Histological Techniques
- Diseases of Fish
- Advanced Mammalogy
- Advanced Ornithology
- Wildlife Diseases

551. (Zool-Botny-Range)**Quantitative Ecology. (3)**

Prerequisite: Botny-Zool 350 or equivalent; Stat 222 or 501 or concurrent registration.

Practical quantitative methods necessary for ecological data analysis.

556. Limnology. (4)

Prerequisite: Zool 350.

Biotic and physical-chemical properties of lakes and streams. Saturday field trips required.

559R. Advanced Topics in Ecology and Systematics. (1-4)

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Advanced Ecology
- Tropical Biology
- Evolutionary Biology
- Field Methods

561. Physiology and Drug Mechanisms. (3)

Prerequisite: Zool 460 or instructor's consent.

Function and regulation of organ systems in mammals. Relationship between normal functions and biological and physiological effects of drugs.

562. Neurophysiology. (3)

Prerequisite: Zool 460 or equivalent.

Structure and function of central and peripheral nervous systems.

565. Endocrinology. (3)

Prerequisite: Zool 460 or equivalent.

Study of mammalian hormones.

569R. Advanced Topics in Entomology. (1-4)

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Insect Taxonomy
- Insect Ecology
- Insect Physiology
- Acarology

572. Gene Regulation. (2)

Prerequisite: Zool 342.

Molecular basis of gene regulation in eukaryotic cells. Emphasis on transcriptional and post-transcriptional controls in nuclear and organellar genomes of animals and plants.

579R. Advanced Topics in Genetics. (1-4)

Prerequisite: instructor's consent.

Subjects that may be offered include:

- Molecular Evolution
- Teratology Techniques

585. Developmental Biology. (3)

Prerequisite: Botny-Mcbio-Zool 341, 342.

Cellular and biochemical mechanisms that achieve differentiation in the developing embryo.

589R. Advanced Topics in Physiology. (1-4)

Prerequisite: instructor's consent.

591R. Special Problems in Zoology. (1-4)

Prerequisite: instructor's consent.

602. Theoretical Ecology. (4)

Theoretical foundations of evolutionary ecology; understanding ecological theory.

604. Phylogenetic Systematics. (3)

Prerequisite: Zool 475 or equivalent.

Theoretical foundations of modern systematics, methods of phylogenetic inference, and discussion of contemporary literature.

610. Molecular Evolution. (4)

Prerequisite: Zool 475 or equivalent.

Theoretical foundations of molecular evolution; molecular phylogenetics, estimates of population genetic parameters, gene duplication, horizontal gene transfer, rates of evolution, molecular clocks.

661. Reproduction and Endocrinology. (2)

Prerequisite: Zool 460 or equivalent.
Advanced course based on current research literature.

662. Renal and Gastrointestinal Physiology. (2)

Prerequisite: Zool 460 or equivalent.
Advanced course based on current research literature.

664. Cardiovascular and Respiratory Physiology. (2)

Prerequisite: Zool 460 or equivalent.
Advanced course based on current research literature.

694R. Research Presentation. (0.5-1)

Oral presentation of graduate research project (introduction, methods, hypothesis, results, conclusions).

695R. Practicum in Biology Teaching. (4-8)

Curricula, principles, concepts, and experiences in teaching zoology effectively.

696R. Graduate Seminar. (1)

Topics vary. See current class schedule.

698R. Master's Project. (Arr.)

699R. Master's Thesis. (1-9.)

799R. Doctoral Dissertation. (1-18)

FACULTY

BAUMANN, RICHARD W., *Professor.* PhD, University of Utah, 1970. Aquatic Insect Systematics; Biology; Distribution.

BELK, MARK C., *Associate Professor.* PhD, University of Georgia, 1992. Evolutionary Ecology.

BELL, JOHN D., *Associate Professor.* PhD, University of California, San Diego, 1987. Pharmacology; Membrane Physiology.

BENNETT, RANDY L., *Assistant Professor.* PhD, University of Wisconsin, Madison, 1993. Oncology; Molecular Developmental Biology; Genetics.

BLACK, HAL L., *Professor.* PhD, University of New Mexico, 1972. Ecology; Mammalogy.

BOOTH, GARY M., *Professor.* PhD, University of California, Riverside, 1969. Insect Physiology; Toxicology.

BRADSHAW, WILLIAM S., *Professor.* PhD, University of Illinois, 1968. Developmental Biology.

BRAITHWAITE, LEE F., *Associate Professor.* PhD, Brigham Young University, 1970. Marine Biology.

BRIDGEWATER, LAURA C., *Assistant Professor.* PhD, George Washington University, 1995. Genetics; Molecular Biology; Gene Regulation; Development.

BUSATH, DAVID D., *Associate Professor.* MD, University of Utah, 1978. Electrophysiology; Molecular Modeling; Molecular Biophysics.

CRANDALL, KEITH A., *Assistant Professor.* PhD, Washington University, 1993. Population Genetics; Molecular Evolution; Conservation Biology.

EVANS, R. PAUL, *Assistant Professor.* PhD, Medical College of Virginia, 1983. Molecular Biology.

FARMER, JAMES L., *Professor.* PhD, Brown University, 1966. Molecular Genetics.

HECKMANN, RICHARD A., *Professor.* PhD, Montana State University, 1970. Fish Diseases; Parasitology.

HENINGER, RICHARD W., *Professor.* PhD, Oklahoma State University, 1961. Physiology; Endocrinology.

JEFFERY, DUANE E., *Professor.* PhD, University of California, Berkeley, 1972. Ecological, Evolutionary Genetics.

JUDD, ALLAN M., *Assistant Professor.* PhD, West Virginia University, 1981. Physiology; Neuroendocrinology.

LEPHART, EDWIN D., *Associate Professor.* PhD, University of Texas Southwest Medical Center, 1989. Neuroendocrinology.

MAURER, BRIAN A., *Associate Professor.* PhD, University of Arizona, 1984. Population and Community Ecology.

PECK, STEVEN L., *Assistant Professor.* PhD, North Carolina State University, 1997. Environmental Biostatistics; Biomathematics; Entomology.

PORTER, JAMES P., *Associate Professor.* PhD, University of California, San Francisco, 1982. Neuroendocrinology; Hypertension.

RHEES, REUBEN WARD, *Professor.* PhD, Colorado State University, 1971. Neuroendocrinology; Physiology.

ROGERS, DUKE S., *Associate Professor.* PhD, University of California, Berkeley, 1986. Phylogenetic Systematics—Mammalogy.

SEEGMILLER, ROBERT E., *Professor.* PhD, McGill University, Canada, 1970. Developmental Biology; Teratology.

SHIOZAWA, DENNIS K., *Associate Professor.* PhD, University of Minnesota, St. Paul, 1978. Aquatic Ecology; Ichthyology.

SITES, JACK W., JR., *Professor.* PhD, Texas A&M University, 1980. Evolutionary Genetics; Herpetology.

SMITH, H. DUANE, *Professor.* PhD, University of Illinois, 1969. Mammalian Ecology; Wildlife Management.

TOLMAN, RICHARD R., *Professor.* PhD, Oregon State University, 1969. Science Education.

WHITE, CLAYTON M., *Professor.* PhD, University of Utah, 1968. Raptor Biology; Ornithology; Avian Systematics and Evolution.

WHITING, MICHAEL F., *Assistant Professor.* PhD, Cornell University, 1994. Entomology; Phylogenetic Theory and Practice.

WINDER, WILLIAM W., *Professor.* PhD, Brigham Young University, 1971. Exercise Physiology and Endocrinology.

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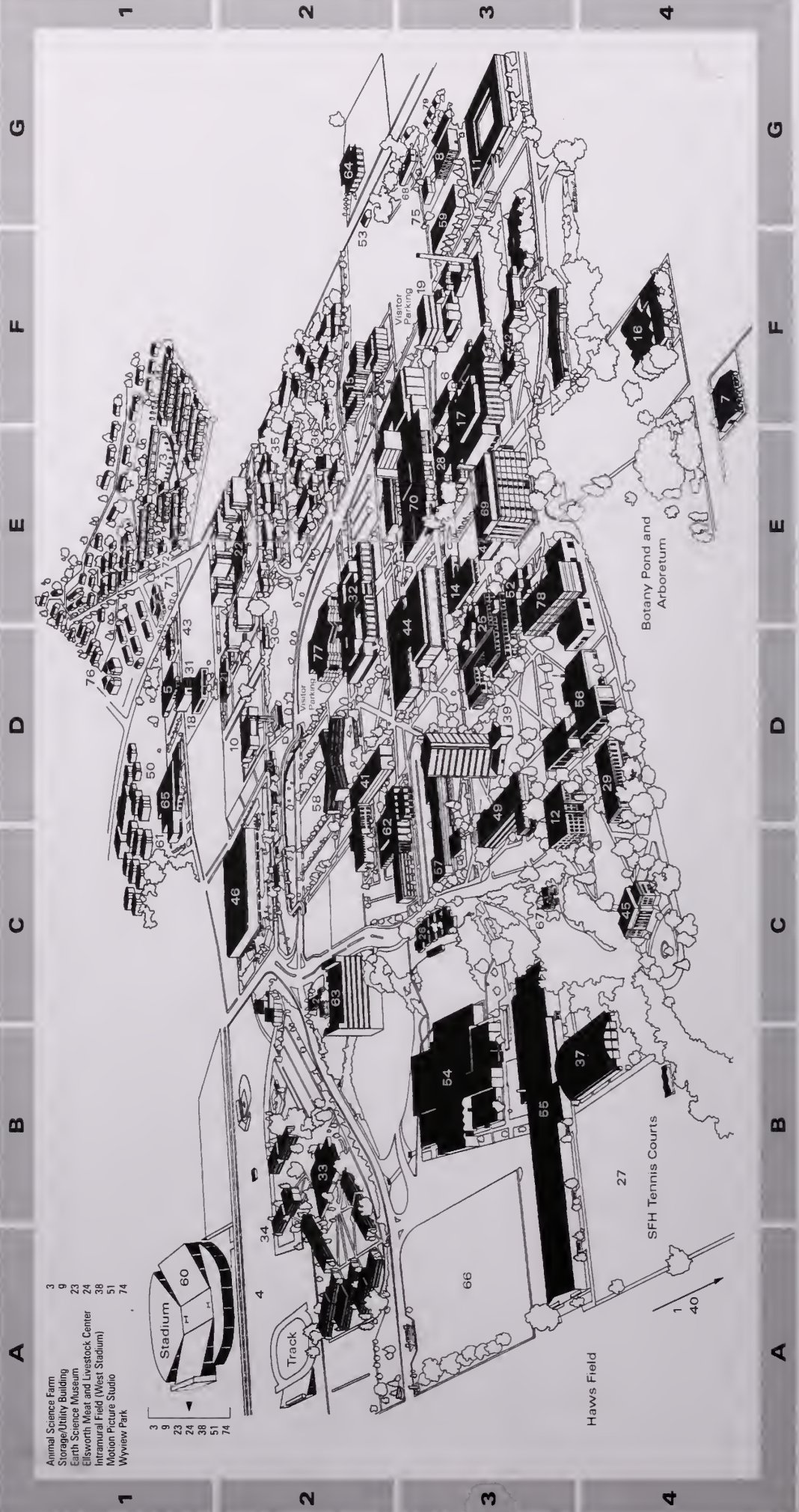
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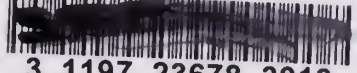
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					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
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					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST	D-2	20	HCEB	LEE LIBRARY, HAROLD B. HARMAN CONTINUING EDUCATION BUILDING	D-3	44	MPS	MOTION PICTURE STUDIO	E-2	22	WOD	WIDOWS BUILDING	E-3
					CANDALL HOUSE WEST													



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